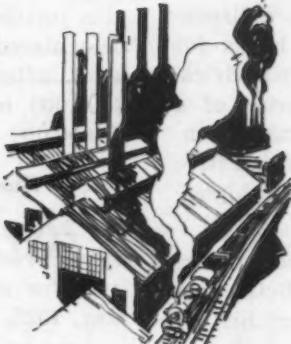


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What Price Bonus?

Is any executive worth \$1,635,753 a year? This question has been the subject of lively discussion since the disclosure that Eugene G. Grace, president of the Bethlehem Steel Corporation, last year received a bonus of \$1,623,753, in addition to a salary of \$12,000. Opinions differ widely, and it is not surprising that such should be the case, since there are no known methods of accurately calculating the value of any employee, whether he be a common laborer or a chief executive. The judgment of employers, supply and demand, custom, bargaining power, living costs and other factors are the determining factors.

Yet there is no doubt that the news from Youngstown caught the country unawares and produced an initial reaction that was distinctly unfavorable. No industrial development in years has been more widely talked about, not alone in the iron and steel industry and financial circles but among millions of wage earners and salaried employees who still find their greatest problem in making both ends meet.

A frequent comment heard in the iron and steel trade was that Mr. Grace's compensation is out of proportion to what is paid executives of other large corporations. But investigation discloses that relatively little is known about the salaries and bonuses of industrial officials, and this is not to be wondered at since in all walks of life one's compensation is regarded as a private matter, which is kept within the closest bonds of secrecy. The statement is made that the late Judge Elbert H. Gary never received more than \$500,000 a year for his services as chairman of the

board of the United States Steel Corporation, but this report cannot be verified.

One of the criticisms directed against the Bethlehem bonuses to executives is that they were paid in years when no dividends were declared. In answer to this it is stated that it is immaterial whether dividends were paid or not, so long as the bonus plan itself was fair and sound. Frequently executives do their hardest and best work in poor years, laying the groundwork for more efficient production and better profits later. The charge is also made that it is unfair to deduct bonuses before allowance is made for depreciation. In reply it is asserted that this is an accounting detail, that there are many different types of bonuses and that the same result might be achieved by using a larger percentage factor after deducting depreciation.

One of the most frequent observations is that the Youngstown disclosure has exploded the idea that industrial executives are motivated less by desire for wealth than "love of the game." It is true that publicists had succeeded in creating the impression that compensation beyond certain amounts meant little, since there is a limit to what a man can spend for personal enjoyment. On the other hand, money means power and influence and will always be valued in those terms.

The real question at issue is how much a man is worth. Many contend that Mr. Grace has earned every cent that he has received. As the head of a large corporation with far flung ramifications he carries heavy

responsibilities. Under his management large munitions and ordnance capacity was written off, important competing companies were acquired and welded into a single, closely knit organization, obsolete and obsolescent plant and equipment were replaced or modernized, and new capacity was added. His remuneration, after all, was for hard work. It did not represent profit from lucky speculation in the stock market. It was not a "rake-off" incidental to consolidating properties. Yet many millions are made in the stock market or as the result of promoting mergers and no objection is raised.

The increasing size and complexity of business organizations is putting a premium on executive capacity. Most corporation directorates make it a point to remind their executives that they are not indispensable, but the fact remains that capable heads for large corporations are increasingly hard to find. Brick, steel and machinery do not insure the success of a company; good management is the all-important essential. "High salaries paid for great administrative abilities," says Prof. F. W. Taussig, "bring not higher expense for management, but lower."

The crux of the question, after all, is whether Mr. Grace's employers, the stockholders of the Bethlehem Steel Corporation, were aware of the size of his remuneration and were satisfied that it was fair. If there be no objection from stockholders, there can be no legitimate grounds for complaint on the part of the public.

Bonus Funds with Other Companies

Intra-company discord has sometimes been caused by executive bonuses. Some years ago minority stockholders in an American company questioned a profit-sharing plan for the chief officers which had been in effect since 1913. In seven years \$4,005,000 is said to have been paid to a relatively small group of executives and only \$7,899,250 in dividends to stockholders. Suit was brought in 1925 against the officers and directors for an accounting, but before the court could make a decision the case was settled privately.

One important American corporation sets aside for the bonus fund one-half of the total profits after deducting enough to pay 8 per cent on its preferred stock and 6 per cent on the common. At first the fund was divided among five or six chief executives, but later participation was enlarged to take in 68 individuals.

In Europe the executive bonus is common. Fixed salaries are small and additional compensation varies with the earnings of the business. Usually a certain amount is allotted from the net earnings for the reserve until it amounts to 10 per cent of the capital; then after a dividend of 4 per cent is paid stockholders, 5 per cent of the remaining earnings goes to the executive or executives and another 5 per cent is divided among the directors. Finally, an extra dividend is paid stockholders from the remainder.

The idea of the executive bonus is a natural outgrowth of the evolution from executive ownership to the corporate form of organization. The reasoning is that the corporation head has a right to expect to share liberally in the fruits of his leadership, just as the executive owner gets the profits accruing from his management. Henry Ford, as an executive owner,

has made many millions, without stirring up violent protests.

Few will take issue with the principle of the executive bonus, but many will challenge specific applications of that principle. The possibility that an executive group may become sufficiently well entrenched to divert a lion's share of the profits to their own pockets will now be taken into consideration by all prospective buyers of common stock. A new uncertainty has been added to the many that the buyer of securities must consider.

An incentive plan is considered the most effective way to bring out the best in a man, whether he be workman, foreman, superintendent or president, but the question can sometimes be raised, with considerable justification, whether the same results could not be achieved with smaller bonuses. Everything is relative, after all, and a compensation of \$250,000 or \$500,000 may prove just as stimulating as one of \$1,000,000 or \$2,000,000.

What Mr. Schwab Has Said of Incentives

Charles M. Schwab, chairman of the Bethlehem Steel Corporation, has long been an exponent of incentives for executives. Writing in *Administration* in May, 1923, he said:

"I might be glad to pay, as indeed I have paid, an exceptional executive more for a year's work than \$100,000. I should, however, never willingly pay it as salary. Such an amount should be given only as a reward for definite operation results accomplished, manufacturing costs reduced, waste eliminated, metallurgical and other processes simplified, new and cheaper sources of raw materials discovered—in a word, for the achievement of what is expressed in that much-abused but none the less potent phrase, business efficiency."

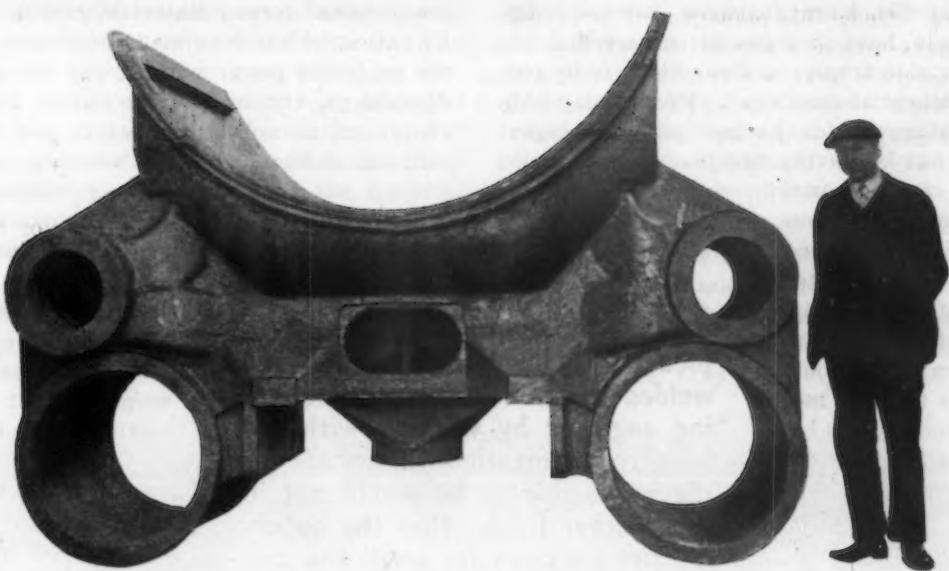
The Bethlehem bonus system was originated by Mr. Schwab. In the 1917 annual report of the company its establishment was announced, as follows:

"The bonus system approved at the last annual meeting of stockholders has been continued with most satisfactory results in all departments of the organization. The total bonus payments for the year 1917 to the officers of your corporation and heads of departments having general control of matters affecting your corporation and subsidiaries as a whole were \$3,913,833.50, and the percentage of such total to the total net earnings of your corporation, after deducting all interest charges and providing for all taxes, but before deducting depreciation, was 7.96 per cent."

Bonuses for Other Than Profit Results

The executive bonuses are based on profits because the only measure of the accomplishment of a company head is the net financial balance at the end of the year. Where a man's activities can be gaged by production, sales, quality of work or savings in materials, other methods of calculating bonuses are used, and that is the case in the Bethlehem organization. Salaries of department heads are low, but opportunities for generous additional compensation are provided in various types of bonus plans, depending on the character of the work done.

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Economic Value of Steel Castings As A Material of Construction

THE desirability of cast steel as a material of construction in assemblies subjected to severe stresses and hard usage has been proved time after time. Cast steel, in fact, has made possible many of the improvements in heavy machinery in the last two decades. Where great strength, or strength combined with lightness, is required in a cast part, cast steel is the acknowledged material.

In many cases where difficulty is found with steel castings, the fault lies not in the quality of the steel but in the design of the part. In the design of steel castings it is not sufficient to distribute the metal properly for strength. It is necessary to bear in mind those points in regard to the molding and pouring of the casting that are essential to insure the production of castings fitted for their intended purpose. In this connection, consultation with a trained foundry organization having as a part of its personnel an intelligent and competent engineering force of broad practical experience is most important. Such consultation regarding the proper application of cast steel will result in good, sound castings that can be depended upon to function properly.

Parts manufacturers, whose products are made of material other than cast steel, have not been slow to capitalize on isolated cases of the failure of steel castings in service. Such failures, however, have been reduced almost to the vanishing point by the improvements made in the production of steel castings in the last ten years. Many things in the making of steel castings depend on an understanding of

By C. B. HARBISON

Mechanical Engineer, Ohio Steel Foundry Co., Lima, Ohio, and Member of the Steel Founders' Society of America, Inc.

the art and, as the art becomes older, it naturally becomes better understood.

It is well to remember that all steel products have their origin in cast steel. In some cases it is cast in sand molds in the shape in which

it is to be used. In other cases, it is cast into ingots, converted into billets, and then further worked into the various required shapes mechanically by the forging or rolling process, and so forth.

Steel castings have proved their worth in many heavy constructions, such as powerful forging machines, power shovels (small and large), locomotives and railroad car construction, where they are subjected to severe and exacting service and their dependability must be of the highest order.

Engineers of the more progressive organizations today are enlarging their knowledge of the adaptability of steel castings to their particular needs by maintaining constant contact with the well-trained and competent organizations in the steel casting industry.

The steel that is used in the production of steel castings is of purer and better quality than that which is often used for other purposes. This is because of the many hazards that must be kept under control in producing steel castings that are not common to the other branches of the steel industry. Also, steel for steel castings is usually made in furnaces of smaller capacity than those in which steel for other purposes is made. These smaller furnaces—usually of 15 to 50 tons capacity—are easy to manipulate and respond more readily to niceties of

control than do the large furnaces in steel mills.

The railroads have practically superseded the old built-up car side frames and car bolsters by side frames and bolsters of cast steel. Present-day side frames and bolsters are for the most part of integral construction; that is, having the journal boxes and other members cast as a part of the side frame and thus avoiding bolting and riveting and the weakness associated with this type of construction. The cast steel side frame and bolster have been such an outstanding success that the mechanical division of the American Railway Association has approved a recommendation that on and after Jan. 1, 1936, no cars with arch bar trucks are to be accepted in interchange.

The use of cast steel for railroad car couplers, on account of its ability to withstand the severe abuse to which a coupler is put, has been of real importance and has made possible one of the major forward steps in railroad efficiency. The use of cast steel for car coupler castings has made possible the high-capacity cars and the operation of much longer trains than would have been possible with less sturdy coupling devices.

Cast steel car wheels—properly designed—are steadily increasing in use due to their reliability, thus making another contribution to the efficiency of our nation's transportation.

For many years, it has been customary to make locomotive driving-wheel centers of cast steel, as the increased power developed by locomotives has made it necessary to have a material that is much stronger in tension and more resilient than cast iron—the material previously used for driving-wheel centers.

The modern locomotive is now practically a cast steel machine, there being from 16 to 65 tons of steel castings used in its construction. The re-

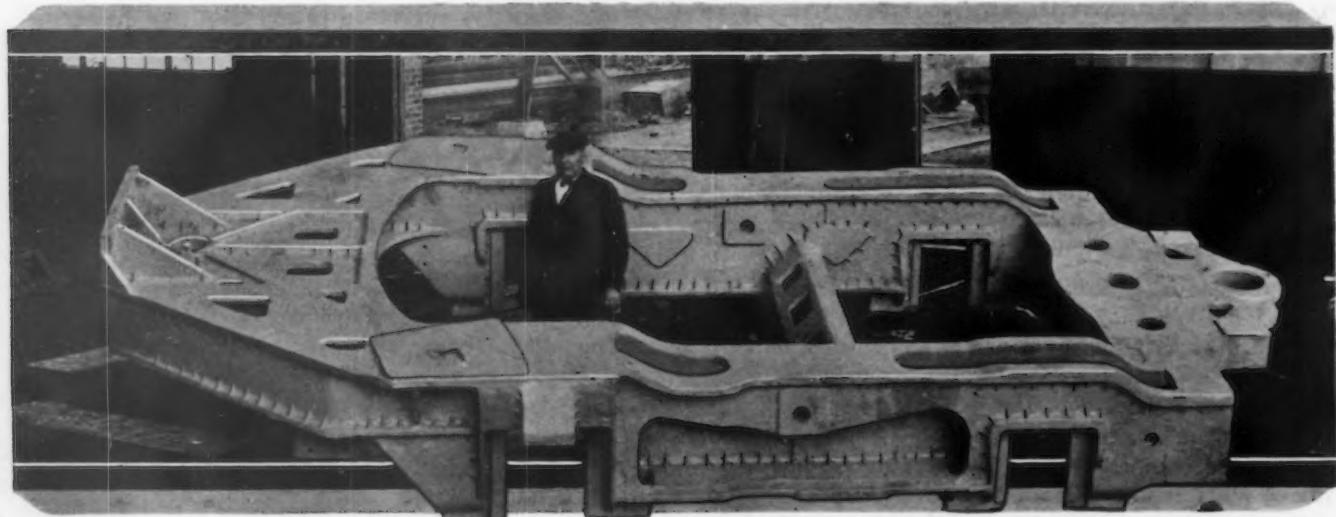
placement of former materials used in its construction by cast steel has been made necessary by the demand for increased power without any increase in limiting dimensions, the track gage having been fixed many years ago, as well as the height and width limits of railroad rolling stock. Therefore, as larger and more powerful engines were built, it became necessary that stronger material be used so as to limit the overall dimensions to the clearances which have been established for many years and to limit the weight to that which could be carried by the rails.

One of the first important members used in the construction of locomotives to be made of cast steel was the locomotive frame. Locomotive frames prior to the adoption of cast steel had been made under the hammer and welded in many places. The top and bottom rails or members of the frames were hammered and the vertical members or pedestals were welded in place. The steel casting manufacturers were called upon to make frames of cast steel in one piece and were so successful that cast steel frames were soon adopted throughout this country and Canada.

Locomotive frames in the "iron horse" of today are in some cases over 44 ft. long, with as much as 98 sq. in. cross-sectional area each and weigh in the rough from 8000 to 24,000 lb. and upward. On account of the high impact stresses, locomotive frames are in many cases made of alloy steels, such steels developing a tensile strength in the neighborhood of 100,000 lb. per sq. in., with elongation and reduction of area amounting to about 25 per cent and 48 per cent, respectively.

To reduce frame failures, crossties made of cast steel for use between the frames were employed, replacing the forged crossties that had been previously used. By tying both frames together and

One-Piece Cast Steel Four-Wheel
Trailer Truck Frame of 18,000 Lb.,
Made by Ohio Steel Foundry Co.

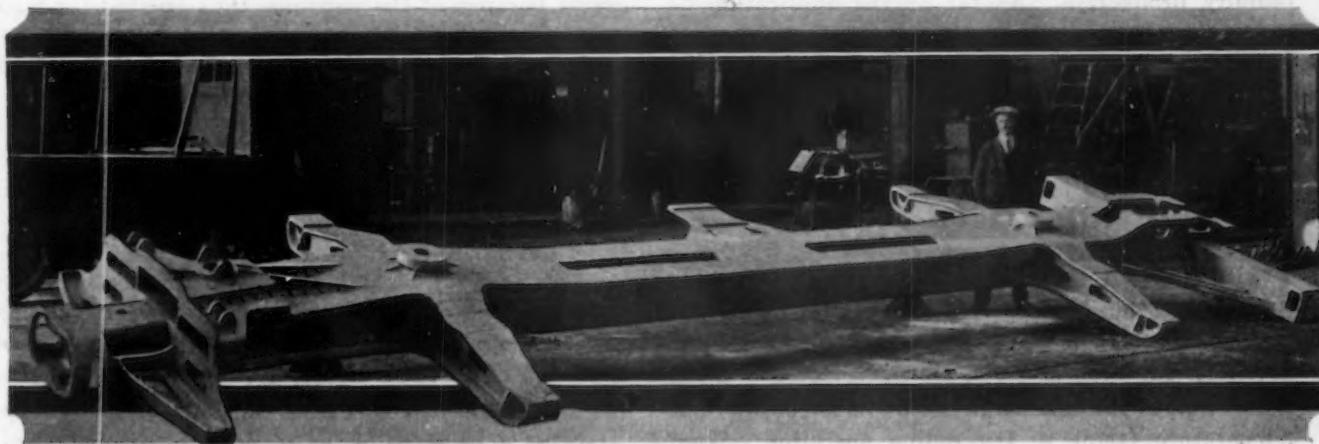


making them act substantially as a unit, it was found that frame breakage was less frequent. The advent of the Walchaerts valve gear, which is outside the frames in place of between them, as is the case with the Stephenson gear, opened the way for the application of more sturdy types of frame bracing, and cast steel was turned to as the material having the necessary strength and which could be formed into practically any desired shape.

From this construction the present day unitary frame or locomotive bed was developed. The present integral cast steel locomotive bed is indicative of the great advances that have been made in the art of

produce, but with proper molding, metal of high quality, and a thorough understanding of the heading and gating of the castings, cylinders of cast steel are produced by the leading steel casting manufacturers that are equal in quality as castings to those that were made of cast iron, and surpass in serviceability those that were made of cast iron.

One of the outstanding developments in modern locomotive design is the super-power type locomotive developed and built by one of the outstanding builders. The development of a four-wheel trailing truck for this type of engine permitted increased fire box size, thus lowering the combustion rate and



steel molding in the last 20 years. The present construction does not present any new principles; the construction consisting in general of a girder formed of longitudinal and cross members in a single piece instead of being built up of separate pieces.

Over 20 years ago attention was turned to the tender of the locomotive, the frame of which was of built-up construction of rolled shapes and plates riveted and bolted together. This construction gave trouble on account of the loosening of rivets and bolts, due to high impact forces and corrosion caused by leakage of tanks, resulting in a high maintenance cost. Steel casting manufacturers again gave evidence of their ingenuity by designing the entire tender frame of cast steel and this type of construction for locomotive tenders is now practically standard in this country. Cast steel tender frames are in many cases over 40 ft. long, 10 ft. wide, and weigh about 30,000 lb. each. Their adoption has practically eliminated tender frame failures.

Modern locomotives are equipped with cast steel cylinders. This forward step was the result of the need of the railroads and locomotive builders to reduce the weight of the cylinders, at the same time increasing their strength. The weight thus saved becomes available in increasing the power of the locomotive and another notable contribution to the efficiency of the nation's transportation system results from the ingenuity of steel casting manufacturers and the adaptability and dependability of their product.

The casting of locomotive cylinders does not present any insurmountable difficulties to the trained foundry organization. They are not easy castings to

One-Piece Cast Steel Tender Under-frame Weighing 11,700 Lb.

adding materially to the economy of operation.

The steel foundry has pioneered in the manufacture of heavy trailing truck frames for the superpower, articulated type locomotive. The value of cast steel again has here been proved, as its use permits the builder to incorporate forms of sections and distribution of metal best to resist the stresses and afford a unitary construction free from troublesome riveted or bolted joints.

There seems to be no limit to the uses of cast steel as a material of construction where great strength and reliability are required. The analysis can be varied to meet a wide range of requirements. By proper treatment, the physical properties can be varied, making it suitable for many purposes.

Proper engineering, which of course takes cognizance of the requirements necessary for the foundry to make a commercially practical job, such as avoiding abrupt changes in sections and thick corners where several members meet, and by arranging as far as possible to have the heavy sections in the cope in the process of molding, assures the production of good, sound castings. In this connection, we might say that engineers do not always give as much attention to the design from a manufacturing standpoint as they should. They would not think of asking a mill rolling shapes to include impossible features inconsistent with the method of manufacture, yet they will ask a foundry to make castings that in some cases are analogous to this. Many times little attention is paid to proper provision for removal of cores and core rods and other important factors.

Annealing to relieve cooling stresses is of the utmost importance and it is well worth the addi-

tional manufacturing cost that results from treating the steel in this manner. The same physical properties are obtained in cast steel when properly treated as are secured in steel that is worked by mechanical methods, such as forged or rolled products.

When the engineer and the foundry organization work together and consider the foundry problems that must be respected when designing, the result is the production of sound castings suitable for the purpose for which they are required. Breakage invariably is due to defects which cannot be overcome because of the improper design of a part for good foundry production. As far as the application of the part is concerned, it may be properly designed for the use to which it is intended to be put and still be improperly designed as an article for satisfactory

foundry production as foundries are set up today.

The various branches of industry take their cues for economy, improvement in construction, bettering of design, etc., from other industries. Others besides the transportation industry are now turning to the steel casting industry for the production of small, medium sized, and large parts of intricate and difficult design to supersede riveted, bolted, or welded assemblies of many parts.

The serviceability and longevity that is available through the use of steel castings results in savings that are truly economic in character. Parts of inferior or unsuitable material result in an economic waste because of the demands thus created for man power to replace or repair defective or worn parts, and they effect a further economic loss because of the stoppage of production.

Relation Between Temperature and Tensile Strength

DISCUSSING the theory of rolling mill practice, before the Association of Iron and Steel Electrical Engineers, at the Buffalo convention in June, E. Kieft, engineer of tests, Illinois Steel Co., Gary, Ind., referred in some detail to the importance of the temperature factor in the rolling operation. What follows is abstracted from that portion of the paper in which this topic is taken up.

Strengths of iron and steel shown in the table are taken from various data published by different authors. The figures have given satisfactory results in practice. The values given for cold steel are averages reported by eminent investigators.

Knowledge of the strength of steel at different temperatures is very important in rolling mill analysis. Much more research work is needed to obtain correct data for the great variety of steels required in modern designs of machinery.

It is possible to check the data indirectly, by application of formulas pertaining to rolling resistance, torque and horsepower. This can be done by means of wattmeters, speed recorders, flywheel and the roll pass data determined from the speed, reduction, roll diameter and dimensions of the sections to be rolled. This leaves the tensile strength as the only unknown quantity in the formulas.

Temperature, Wrought Deg. Fahr.	Iron Carbon 0.05-0.15%	Pounds per Square Inch at Varying Temperatures			
		Mild Steel 0.30% 0.50%	Mild Steel 0.75% 1.00%	Hard Steel 0.75% 1.00%	Hard Steel 0.75% 1.00%
2,200	2,250	...	...	...	...
2,100	3,500	4,000	5,600	6,500	...
2,000	4,500	5,000	7,300	8,800	13,000
1,900	5,100	5,800	7,300	8,800	13,000
1,800	5,800	6,700	8,800	11,000	17,000
1,700	7,000	8,600	10,700	13,800	23,000
1,600	8,600	10,000	12,500	15,600	31,000
1,400	12,600	14,000	15,500	17,000	...
1,200	18,000	...	...	...	...
1,000	25,600	70,000	85,000	100,000	120,000
cold (60)	50,000	70,000	85,000	100,000	120,000

Development of Electric Power Surveyed

ONE of the sessions of the World Power Conference, in Berlin in June, was devoted to applications of electricity to many uses. Report of a committee dealing with electric power was one of the papers read. What follows has been taken from *Engineering*, London.

In the application of electricity to power, the efficiency of the motor itself is not the primary consideration, as an improvement in the quality of the product or an increase in its quantity depends mainly on the reliability, accessibility and simplicity of the drive. Since the early days, the movement has been from the central drive to the group drive, and then to the individual drive by single motors.

Extended application of the last-mentioned method to the most varied types of machines has resulted in the production of open, protected, inclosed and built-in motors, as well as in the use of roller bearings, in combinations of motors and lay shafts, and in constant and variable-speed units. There have been developments also in the starting and regulating equipment, in the protective devices, and in remote and automatic control systems.

Sub-division of the power transmission on the ma-

chines themselves, and distribution of the load among several motors mounted on the working shaft or tool, have been greatly assisted by the application of sound electrical principles in the design of the individual motors. It has led to the direct coupling of the motors to the machines as, for instance, on spinning frames and centrifugals, where speeds of from 10,000 to 30,000 r.p.m. are required.

It has also necessitated an investigation into the internal mechanical transmission on machines where the accurate automatic control of the individual parts in relation to one another is essential. For instance, on paper-making machines the use of the multi-motor drive has overcome the drawbacks of mechanical transmission and has resulted in an improvement in the quality and increase in the quantity of the product.

Similar problems occur on rolling mills, where an automatic, rapid and accurate control of the individually-driven rolls is essential. Endeavors are, in fact, being made to eliminate gearing as the final intermediate mechanical drive. This necessitates separate synchronous drives for the top and bottom rolls.

Cutting Keyways on Rolling Mill Table Rollers

ROLLING mill machinery, as built today, is a much more refined product than was formerly the case. Greater care in design, better materials and finer machine work are exhibited in the product of the past few years. The rough and ready type of machine work which used to be considered "good enough" will no longer do for the rigid requirements of today. Old methods and machines are fast giving way to improved methods and better tools.

Modern design of rolling mill machinery has complicated the work of the engineer and machine shop superintendent and taxed their ingenuity to the limit. The machine tool and cutting tool engineers are frequently called into the picture and asked to produce something different to suit the new conditions.

A recent visit to the modern machine shop of the Hubbard Steel Foundry, division of the Continental Roll & Steel Foundry Co., located at East Chicago, Ind., was illustrative of this trend in the production of rolling mill machinery. This shop is large and well equipped with large and small machine tools. It is a noteworthy example of a well lighted shop, both by day and night. At the Hubbard plant there are two steel foundries, one specializing on large steel

castings, the other on small steel castings, and there is also a roll foundry.

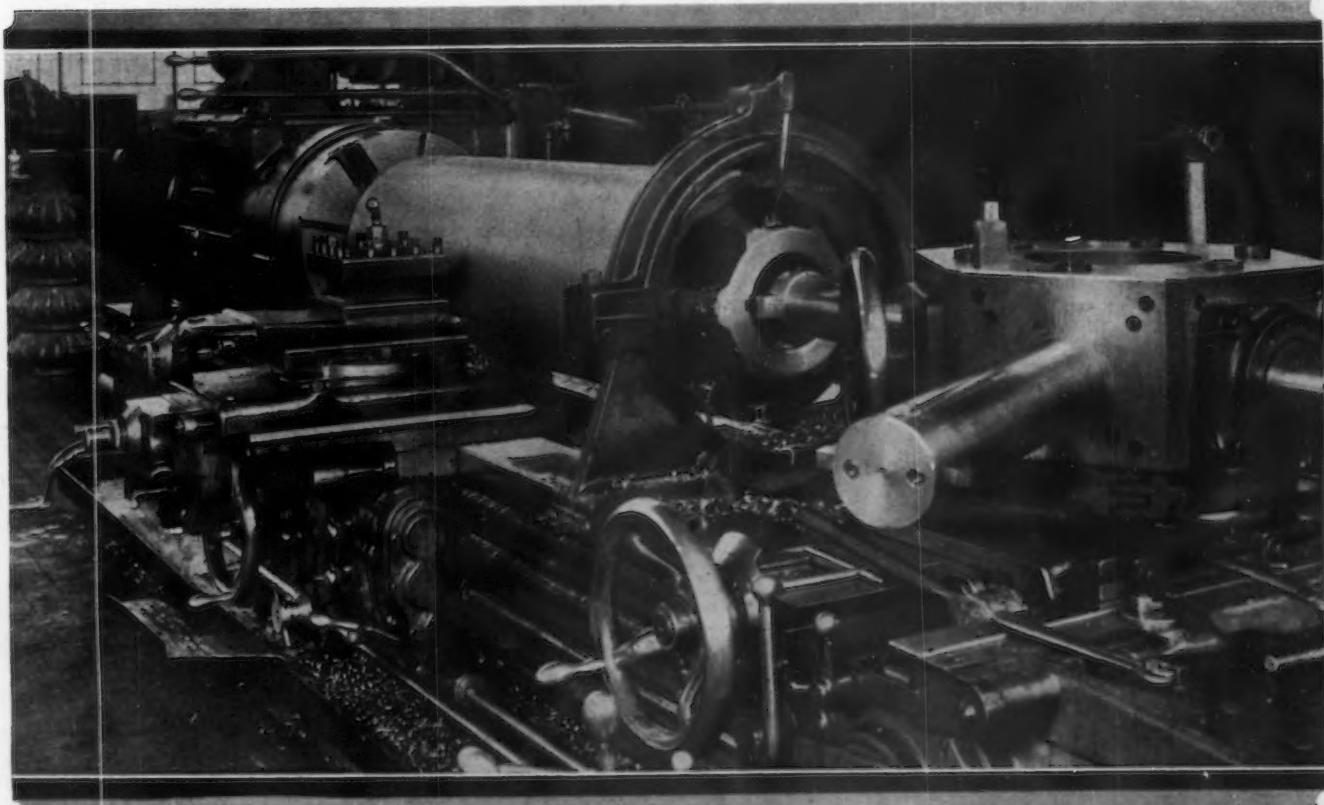
This company produces miscellaneous steel castings and rolling mill rolls, both rough and machined, but a large part of the work produced in the machine shop is rolling mill machinery and finished castings for the steel industry.

Many interesting machining methods were noted, but one of particular interest was the machining of table rollers on a Libby lathe. These rollers are steel castings weighing about 2000 lb. and are 18 in. in diameter and 5 ft. long. The machine work consists of turning the body, boring and facing the hubs and keyseating one hub. The machine employed is a new 27-in. type-H Libby with cross sliding turret, made by the International Machine Tool Co. and toolled up for the job.

The rough casting is chucked on one end and a special center in the turret is placed in the core at the other end. A space on the periphery is turned to accommodate the steady rest, which is then moved into place. The hub is bored and faced while the body is being rough turned. There is nothing particularly unusual

(Concluded on page 314)

KEYSEATING of the hub is done from the cross-sliding turret with the casting in the set-up for the body turning operation



Aluminum Now Competes with Copper, Steel and Other Products

FIFTEEN years ago, a popular notion among engineers was that "aluminum is one metal we can get along without." While this notion is not prevalent today, some people continue to be professionally bearish on aluminum, apparently being unwilling to acknowledge, or being unaware of, the remarkable developments that have taken place. Among engineering materials, aluminum has come to the front very rapidly of late years and has firmly established itself because of intrinsic worth, despite the heavy handicaps of high price, competition with older metals and shortsighted merchandise methods.

In these days of declining commodity prices, dubious business outlook, and unsettled market conditions, the economic situation of the metals is naturally of interest to producers and consumers alike. Competition among engineering materials has never been more keen than at the present time, costs being considered first and last in the great majority of cases. In selecting materials for construction purposes, that material serves best which is the least expensive and at the same time functions most efficiently. Of course, if a material is not suited for a given application, it is not cheap at any price. On account of the low specific gravity, startling economies are often shown by aluminum or its light alloys in competition with heavier materials that are less expensive on a pound basis.

Aluminum is probably in a better position today

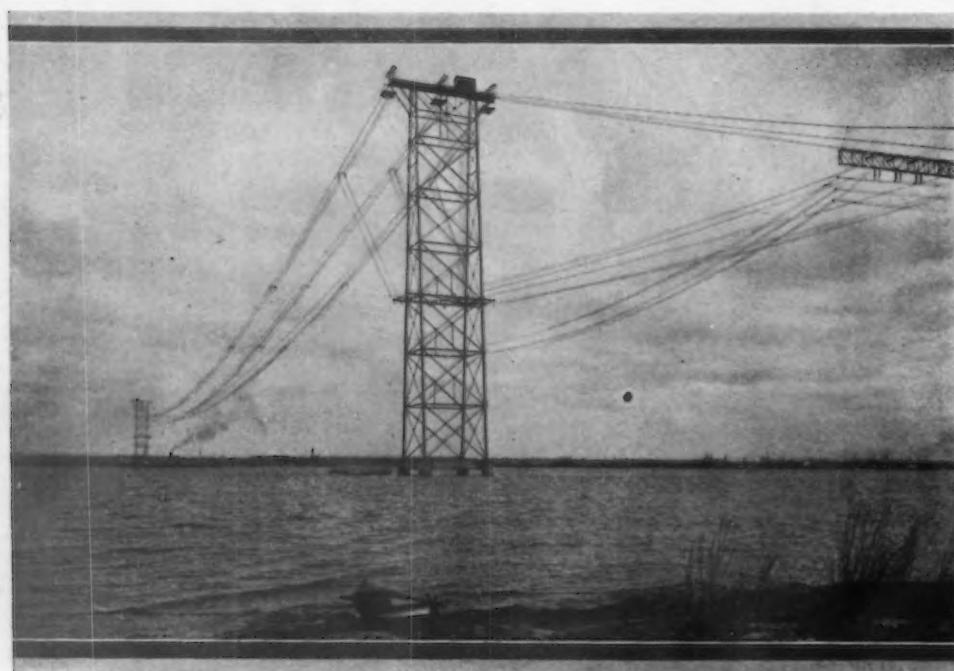
By DR. ROBERT J. ANDERSON

Consulting Metallurgical Engineer,
Cleveland

than any other non-ferrous metal except nickel. While the selling price has been too high, it has been very steady. Whenever there are wild fluctuations in

commodity prices, as has been the case lately with copper, for example, attention is given to the possibility of using substitutes. There is nothing that sours the conservative consumer more than violent and uncalled for price variations. When it is considered that, despite an average price of about 33c. per lb. during the past 25 years, world aluminum consumption has risen from about 20,000,000 lb. (in 1904) to upward of 600,000,000 lb. last year (not including scrap and secondary metal), and that aluminum has displaced iron and steel, copper and its alloys, tin, zinc, wood, and other materials from special fields, it is remarkable to say the least.

The centennial of the discovery of aluminum was duly celebrated about five years ago, but industrially the metal is only about 40 years old. Today, no metal has more widely diversified uses, and none has better possibilities for greater percentage growth in consumption. The long-term outlook for aluminum is probably better at the present time than ever before in the history of the industry. Merchandising methods of some producers have undergone marked change of late, and are in decided contrast to earlier policies. A sound selling policy for any commodity is to establish that commodity only in such basic fields as it serves economically and efficiently. This general plan



LONG span of aluminum steel-cored cables at Three Rivers, Quebec. (Shawinigan Water and Power Co.) This overhead crossing is one of the longest in existence—distance between towers is 4800 ft.

RADIAL aviation engine, 525 hp. (Pratt & Whitney Aircraft Co.) This motor develops 525 hp. at 1900 r.p.m. and weighs 785 lb. Heat-treated aluminum-alloy castings used in construction. (Top of facing page)

of merchandising is being followed in the world aluminum industry.

Technical Developments Are Many

SINCE the World War, a number of important technical advances, and departures from previous standard practice, have been made in the aluminum industry. In some cases, these developments have led to decreased costs, in others to new products, and in still others to better quality and superior mechanical or other properties.

Technical advances have been witnessed in the reduction end, in fabrication and founding, and in the utilization of aluminum and its alloys. As a direct consequence, the market for the metal and manufactures thereof has been greatly broadened. Efficiency of operation throughout all branches of the industry is far greater than ever before, due in part to the introduction of mass production handling methods and in part to technical developments resulting from research. Only a cursory view of recent innovations in the metallurgy of aluminum can be given here, but more complete details may be had elsewhere.^(a)

Metallography of Aluminum

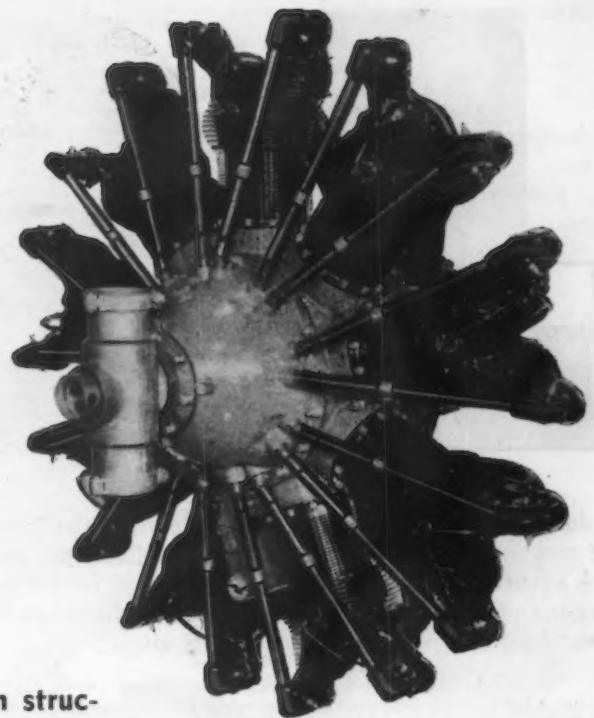
In works practice, scientific methods for testing the quality of aluminum and aluminum alloy manufacturers are being widely applied, with the result that products are now being made to rigid specifications, and of uniform and high grade. Whereas 15 years ago, comparatively little investigative work was being done in aluminum metallurgy, activity in research of late years has been most remarkable. The metallography of aluminum has been developed to a science ranking with that of steel. Lack of a working metallography had long been a deterrent to developing many engineering uses of aluminum alloys.

Several new processes have been introduced into practice for the preparation of alumina, the most important of which is a perfection of the Hall thermal-smelting method by the Aluminum Co. of America. This is in operation at Arvida, Canada. One of the outstanding achievements has been the development of the Hoopes process for the production of more aluminum. Previously, the highest grade metal obtainable contained about 99.7 per cent aluminum. Hoopes aluminum has been of inestimable value in working out the metallography and heat treatment of the light alloys, and has found commercial application in the production of so-called Alclad sheet.

Alloys of 1920 Obsolete Now

The past ten years have witnessed an almost complete revolution in aluminum alloys, both for casting and working. Thus, alloys used as standard in 1920 are practically obsolete today. Cast and heat-treated alloys are being made with tensile strengths of 35,000

(a) R. J. Anderson, "Innovations in the Metallurgy of Aluminum," paper before the World Engineering Congress, Tokio, Japan, October, 1929.



IN cables, in machinery, in structures of various types aluminum and its alloys, heat-treated, are finding increasing applications, due to extended research. New technical developments have been numerous in the last few years

to 45,000 lb. per sq. in. and with very satisfactory elongations. Wrought aluminum alloys are made in regular production with tensile strengths of 60,000 to 70,000 lb. per sq. in. and 20 to 10 per cent elongation. Alloys are produced with Brinell hardness of 160, after heat treatment.

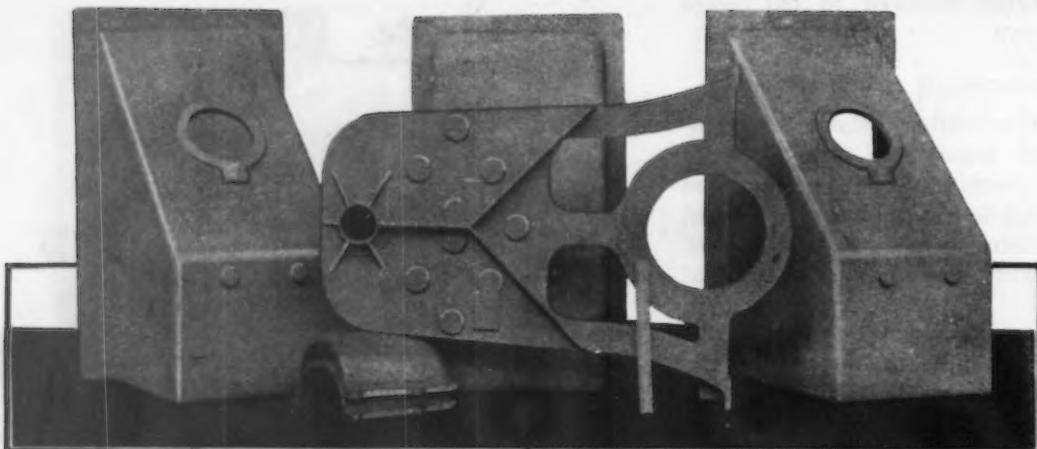
Melting in the aluminum industry is being done in much larger units than previously, and the technique of handling large quantities of liquid aluminum has been well worked out. Metallurgical practice in the secondary branch has been much improved, particularly as regards the pre-treatment of scrap and furnacing methods. Prior to 15 years ago, practically all aluminum alloy castings were made by sand founding. Since 1914, the die-casting process has been applied on a large scale for aluminum alloy work, and the long-life mold process has appeared since 1918 and become an important production method.

Heat Treatment Has Enlarged the Market

Another one of the outstanding developments is the commercial application of heat-treatment processes to both cast and wrought products. This has been one of the most potent factors in enlarging the market for aluminum alloy manufactures in direct competition with steel. Another development of important note is the rolling of large I-beams and shapes, similar to those made in steel. Great improvements have been made in extrusion technique, while forged products are now being turned out in large quantities. Electric spot welding is now practical. Studies made in developing methods for rendering aluminum products more resistant to corrosion by ordinary and special media have been of great practical value.

New and Extended Uses Developed

ANY comprehensive discussion of the applications of aluminum and its alloys, both for engineering construction and in other fields, would fill a large



MARINE castings (William Mills, Ltd.) Parts made in aluminum-silicon alloy to resist corrosion by salt water.

volume. Here, it is possible only to indicate the trend of new uses, the more outstanding applications, and the nature of the consuming industries. The following list of industries will give an idea of the range of consumers that use aluminum and its alloys:

Aircraft, automotive (motor cars, buses, trucks), building, camera and photography, chemical, confectionery, cooking utensil, electrical manufacturing, food, foundry, household appliance (including vacuum cleaner and washing machine manufacturers), metallurgical reduction (alumino-thermic), power and public utility, printing, radio; railroad and street railroad equipment, rubber, ship building, stamping, steel, tobacco, toy, and X-ray equipment.

The bulk of the aluminum used is taken by the aircraft, automotive, general casting, chemical, electrical manufacturing, household equipment, power, radio, stamping, steel and utensil lines.

Research Has Broadened the Field

Systematic research has played a prominent role in broadening the field of application of aluminum and its light alloys, commercial uses now being found that were considered quite out of the question a few years ago. Speaking generally, aluminum is being used in increasing quantities by several industries where hitherto consumption has been relatively small, a notable example being in machine tool building. At the same time, a number of industries are still apparently unaware of the advantages of the metal or have not learned how to use it.

There are still new fields to be cultivated. From the point of view of consumption, the most important feature of the world aluminum situation in recent years has been the large aggregate buying for increased and widely diversified uses. This is the factor that makes for fundamental stability in the industry, and it reflects the results of research, together with systematic efforts of producers to widen the market.

Products into which Aluminum Enters

Products made in aluminum or aluminum alloys include such diversified items as the following:

Cables for electrical conductors, furniture, nails, chemical apparatus, screw-machine products, sheet, foil, rod, wire, rivets, extruded shapes, molding, collapsible tubes, forgings, powder for paint, shingles, radio condenser plates and shields, pistons, connecting rods, ornamental and architectural castings, conduit, tubing, coils, bus bars, and all kinds of castings made by the sand, die, permanent-mold, slush and centrifugal processes.

This list is only suggestive but gives a rough picture of the widely different fields of application.

Over 300,000 Miles of Aluminum Cable

Great advances have been made in the use of aluminum cables (both steel-reinforced and alloy) for overhead electrical power transmission, over 300,000 miles now being installed. There has been increasing interest in, and use of aluminum and its alloys in all forms of modern transport—land, water, and air. The results of tests and practical experience point to future extensive use of aluminum alloys in the construction of passenger cars on steam railroads, electric street railroads, and elevated and subway lines. Reciprocating assemblies for locomotives have been tried out with very satisfactory results. Aluminum alloy pistons are now standard equipment on most makes of passenger motor car engines and are also being used extensively in bus and truck motors, as well as in Diesel engines.

Wide Use in Aircraft

Development of huge rigid-structure airships of the Zeppelin type gave impetus to the production of wrought aluminum alloy manufactures of the duralumin class. In airplanes, the tendency is toward all-metal construction and duralumin-type products are favored in building this class of craft. In marine engineering, the position of aluminum has advanced



Aluminum-alloy brake shoes (William Mills, Ltd.) Made of aluminum-silicon alloy, cast in permanent mold, used on London omnibuses.

greatly, having received stimulation by the conferences on limitation of armament. Very extensive use has been developed for aluminum paint, both for inside and outside work. One of the newest and most important fields for aluminum alloys is in modern architecture, for spandrels, finials, crests, window frames and sills, and ornamental castings.

Another interesting development is the manufacture of chairs and other office furniture from wrought

years most American motor car manufacturers have switched to aluminum alloy pistons.

Aluminum Alloys in Machinery

Also, aluminum alloy castings are finding increased use in machine tool building, in place of cast iron, present consumption being probably 25 times what it was a few years ago. There are innumerable instances of the substitution of gray iron castings by aluminum



ALUMINUM-ALLOY castings used in radial aviation engines (Pratt & Whitney Aircraft Co.)

Parts are—Starting with the three large castings in the back row, left to right—Crankcase nose section, Crankcase induction blower section, and Crankcase rear section.

Second row of small parts, left to right—Oil pump end plate, generator drive bracket, cylinder head, oil pump, breather, piston, blower shaft bracket and generator drive cover.

Front row of small parts, left to right—Thrust bearing cover, oil pump pressure section, oil pump suction section, carburetor ell inspection port cover, magneto drive shaft cover, fuel pump drive bracket, gun synchronizer cover, fuel pump pressure relief body, rocker box cover, and oil bearing bracket.

aluminum alloys. Finally aluminum foil is finding extensive employment in wrapping food products and tobacco, while aluminum collapsible tubes are being produced in large quantities.

How Aluminum Competes with Other Metals

THAT aluminum, either as such or in the form of alloys, is a firmly established competitor of both ferrous and non-ferrous materials is readily apparent from a hasty glance at the variety of consuming industries and the principal uses. Confines of space preclude making any attempt here to show why aluminum is used in preference to some other material in a long list of specific applications. However, the fact that it is so used is of importance to all the major metal industries and to consumers individually.

While it might seem as though it would be impossible for aluminum alloy castings to compete with cast iron parts because of the difference in price, there are many cases where the former are used because of resistance to corrosion, specific lightness or some other definite reason. A notable example is the aluminum alloy piston. Cast iron pistons are practically unknown in Europe today, while in the past three

alloy castings in the moving parts of machinery and in vehicles for transportation.

In a 14c. copper market, aluminum alloy castings cost about two-thirds that of brass castings with aluminum at 24c. The fact that aluminum alloy castings are cheaper than brass castings is a decided factor in influencing the use of the former. Both wrought and cast brass are still used for many purposes where aluminum or aluminum alloys would serve equally well and at less cost.

Direct Competitor of Copper

Aluminum is a direct competitor of copper in the cable field for high-voltage electric power transmission. Whenever the price of copper rises, the use of aluminum, more generally in electrical machinery and for power transmission, is given added impetus. Continental European countries, that are large importers of copper and at the same time producers of aluminum, have given searching attention to this matter. In competition with copper, writers in American financial journals appear to regard aluminum as a sort of recurring but harmless bugaboo. This view of the matter has been put forward many times

recently, evidently with the view to bolstering the courage of disheartened holders of copper stocks.

Copper and Aluminum Output

It seems the attitude is taken that, because world copper output is currently about six times the aluminum production, there is no cause for concern. In 1913, however, world copper production was about 13 times the aluminum production. It is estimated that by 1938, the copper output may be not more than four times the aluminum output. If comparison is made between the two metals on a volume basis rather than by weight, it is readily apparent that the day when the consumption of aluminum exceeds that of copper is not so far away.

The view, which it is desired to emphasize here, is not that aluminum will replace copper on a wholesale scale, but rather that aluminum is a powerful competitor of the red metal and that inroads have been made in the copper field. On the basis of specific gravity alone, one pound of aluminum replaces 3.3 lb. of copper. In the cable field, since the electrical conductivity of aluminum is about 61 per cent that of copper, 0.5 lb. of aluminum replaces 1 lb. of copper.

How Aluminum Competes with Steel

In the case of steel, there is much direct competition with the light metal but the effects are not so apparent because of the large tonnage of steel produced. To mention only a few cases, steel sheet is in competition with aluminum sheet for cooking utensils and with aluminum alloy sheet for motor car and truck bodies. Aluminum alloy forgings have

replaced steel forgings in numerous instances—for example, motor connecting rods.

In the aircraft field, competition between wrought aluminum alloys and alloy steels is being carried on strenuously. Aluminum comes into competition with zinc in the form of sheet for many purposes and as paint. Many are the wars that have been waged over zinc-base versus aluminum-base die castings.

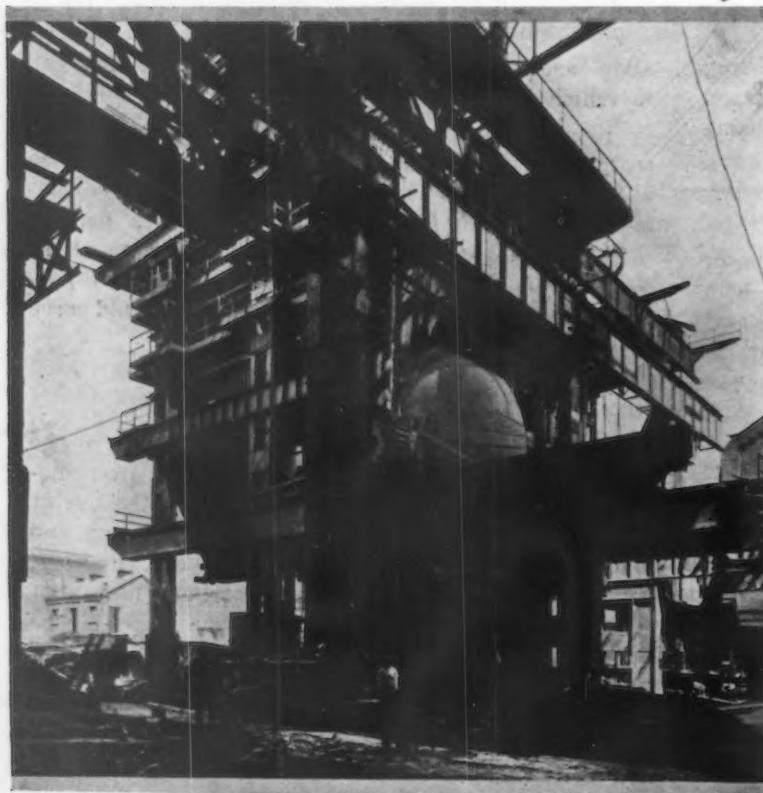
Aluminum and lead are competitors in the forms of collapsible tubes and foil and as materials in the chemical industry. So far, aluminum and tin have vied chiefly as foil and collapsible tubes. Heavy inroads have been made by aluminum in the foil field.

Aluminum-Coated Sheets versus Tin Plate

Tin producers have something to worry about in viewing the development of aluminum-coated steel sheet as a substitute for tin plate, while the use of aluminum sheet as a canning material in place of tin plate bears watching by both tin and steel industries. Also, aluminum-coated steel is a possible competitor of galvanizing. Nickel and aluminum have come in contact mainly as utensils.

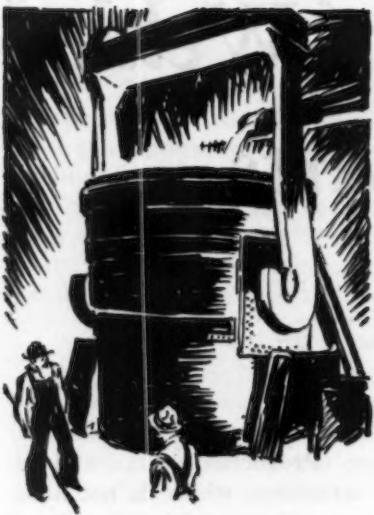
Summary

TO sum up: Aluminum has already made serious inroads into the established fields of other metals because for certain purposes it is indispensable; in other cases, its lightness is advantageous; in still other instances, it is more economical or serves more efficiently. In the future, it seems evident that it will be used more widely and in increasing quantities as its value becomes better known.



THE Largest German Thomas Steel Converter Has Just Been Completed at the Hoesch Eisen und Stahlwerke, A. G., Dortmund, Westphalia. It has a capacity of 45 tons to a charge and was built by the Jünkerather Gewerkschaft of Jünkerath in the Rheinland, established since 1687. Certain features of the converter are being patented in Germany and abroad.





Slag Control Essential

Mass Production of Steel in Rapid Heats Will Require More Knowledge of Slags, Less Delay for Laboratory Reports, and More Rapid Charging of Light Scrap

By FOLKE W. SUNDBLAD*

DEVELOPMENTS in the steel industry in recent years, and especially in the open-hearth department, have made it possible to visualize with a reasonable degree of certainty the future trend of the basic open-hearth process when applied to the so-called tonnage mill. It is a reasonable prediction that in the not too distant future we will build open-hearth plants having unusual capacities without lowering the quality of the product.

Two post-war developments will undoubtedly have great influence on the future mass production of steel, viz:

Greater knowledge of the working relationship between slag and metal, and consequently closer control of the quality of the product.

Revision of the present methods of charging, so as to absorb satisfactorily the light and bulky scrap from the automotive industry.

To meet the keen competition of the post-war period, operators found it necessary to expand the steel-melting capacities in order to reduce the total cost of ingots, until we now have stationary open-hearth furnaces up to 350 tons in capacity. Simultaneously the ever-increasing demands for better quality (especially from the automotive industry) forced steel makers to undertake extensive research work. Energetic efforts have been made to solve some old yet still very actual problems concerning different slags formed in the basic open-hearth process during the working of a heat.

It is now an accepted fact that the quality of the metal is directly dependent on the condition of the slag. Steel men of the modern school also claim that the human eye cannot be depended upon to decide if a heat is bad or good. Any furnace man has had the experience of having a heat, which seemed to have the earmarks of being well shaped up, go wrong in the rolling mills—and vice versa.

*Steubenville, Ohio.

Experience has shown that if a heat has been worked with an extremely thin slag and at a high temperature without any lime additions in the final stage, the product will very likely prove more satisfactory chemically than physically. The probable explanation for this is that the increased temperature has produced a "forced" equilibrium at the time of tapping between carbon and iron oxide, and later carbon monoxide is released and partly entrapped in an excess of deep seated blow holes.

The above example is analogous to working a high-sulphur heat in stationary furnaces. This has been widely discussed by open-hearth operators. Some go as far as to claim that if sulphur is cut down approximately 0.025 per cent, the physical properties of the product are adversely affected (due, perhaps, to an unnatural strain in the relationship between slag and metal).

But the real question remains: "Is there no way whereby the furnace man can determine the true condition of the bath?"

Slags Can Be Read for Sulphur

The logical trend in recent studies on this subject has therefore been concentrated upon the search for a sure "yardstick" of practical value. It has thus been established in actual furnace operation that the solidified slag, through its color, density and structure, mirrors certain conditions in the steel bath, the knowledge of which tells us a true story of what can be expected of that particular heat both chemically and physically. For instance, when a slag shell, particularly from a low carbon heat, cooled in air, shows a deep, reddish-brown color extending down to a certain depth in the fracture, that slag test may be read with the same accuracy regarding sulphur as any furnace man can read the carbon from a steel test. Of course, local variations

(Concluded on page 314)

Commercial Production of Welded Steel Machinery Parts

By G. D. SPACKMAN

President Lukeweld, Inc.,
Coatesville, Pa.

CAREFUL investigation discloses the fact that the movement toward the substitution of welded plate construction for castings started in about 1914. This was about the time when the automotive industry started to use welded steel banjo-type axle housings in place of the composite type with cast differential housing. By 1929, 152 machinery manufacturers were known to be using some welded steel construction in place of castings and were rapidly extending the use of this type of machinery parts.

Many machinery builders are not adequately equipped to fabricate welded steel parts and have had no experience with the welding processes. Some manufacturers would like to buy the parts from an outside source until such time as they acquire a better understanding of the manufacturing methods involved.

The capital outlay for welded steel fabrication is necessarily large and a manufacturer is no doubt justified in gaining some experience in the matter before making heavy expenditures for equipment and plant alteration. Out of this situation has grown a demand for commercial production of welded steel parts. In this brief article, only the fundamental considerations involved in the matter can be discussed. But it appears possible to at least mention the principles around which a commercial production plant has been built.

Physical Behavior of the Welded Assembly

Everyone who studies the subject reaches the conclusion that the welded steel assembly must behave, under service conditions, exactly as if it were all one piece. In other words, if the physical properties of the welded assembly must be discounted because of the welding, prediction of the behavior of the piece becomes too complicated for use in commercial machinery.

Assuming that no discounting is necessary because of the welds, all of the mechanical design formulas heretofore used on castings immediately become applicable to the welded structure.

THAT there is a large place for the company specializing in making welded composites for machinery builders is the contention of the accompanying article. Mr. Spackman finds wide applications for utilizing plate steel but does not hold that welded steel construction can be applied to replace all castings. He does, however, limit the exceptions substantially to the fields of small castings and of castings made of metal that cannot be welded satisfactorily

Production of welded structures which do not have to be discounted involves three important requirements:

1. Use of welding quality steel as material of construction.
2. Weld metal which has physical properties which are at least as good as those of the original and unwelded steel.
3. Rigid procedure control of the welding operations to assure the certainty of the completed weld behavior.

The three requirements stated above predetermine, to a considerable extent, the manufacturing methods to be employed in the production of welded steel assemblies for machinery parts. While there remains some choice of chemical analysis of the steel, the choice of welding processes falls within a narrowly restricted group. The procedure control employed is an outgrowth of the practice used in the welding of pressure vessels, where the vessel is to be heavily insured against all losses resulting from failure of the weld.

Good Appearance Essential

In the earlier stages of development of welded steel machinery parts, it was believed that structural shapes could be welded together to serve the purpose. However, machinery builders have found that customer acceptance of this type of construction leaves a good deal to be desired. Properly cut and formed plates produce a welded steel assembly which is acceptable for use in high-grade machinery. The accompanying illustrations bring this point out to good advantage. One shows the welded steel equivalent of a casting which is so nearly like a casting that it is difficult to distinguish any difference. The letters of the machinery manufacturer's name were cut from steel and welded on the part. The other reproduced photographs show parts which have an acceptable appearance.

There are cases, of course, in which structural steel may be applied in an assembly in such a manner as to conceal its presence. From the technical point

of view, there is very little reason why the entire assembly should not be made of structural steel if a saving could be effected in this way, but the machinery manufacturer has to contend with conditions other than the mere technical point of view, if he is producing high quality and high priced machinery.

The technical situation relative to the use of structural steel, however, is handicapped by the fact that welding quality structural steel is not readily available on the market and certain heat treating operations are necessary to eliminate the necessity to discount weld behavior when used to join structural members made from the ordinary structural steel.

Material Handling

The machinery builders' requirements necessitate the production of welded steel assemblies in much less time than is possible in the case of castings. This situation grows out of the very frequent change of design of modern machinery together with the demands of the machinery users for quick delivery on special machinery.

An investigation of the practice followed by manufacturers who are using welded steel construction discloses the fact that problems of material handling constitute the "neck of the bottle" so far as produc-

tion rate is concerned. Solution of the problem of getting welded steel assemblies through the production shop involved the design of new handling equipment which was better adapted to the requirements.

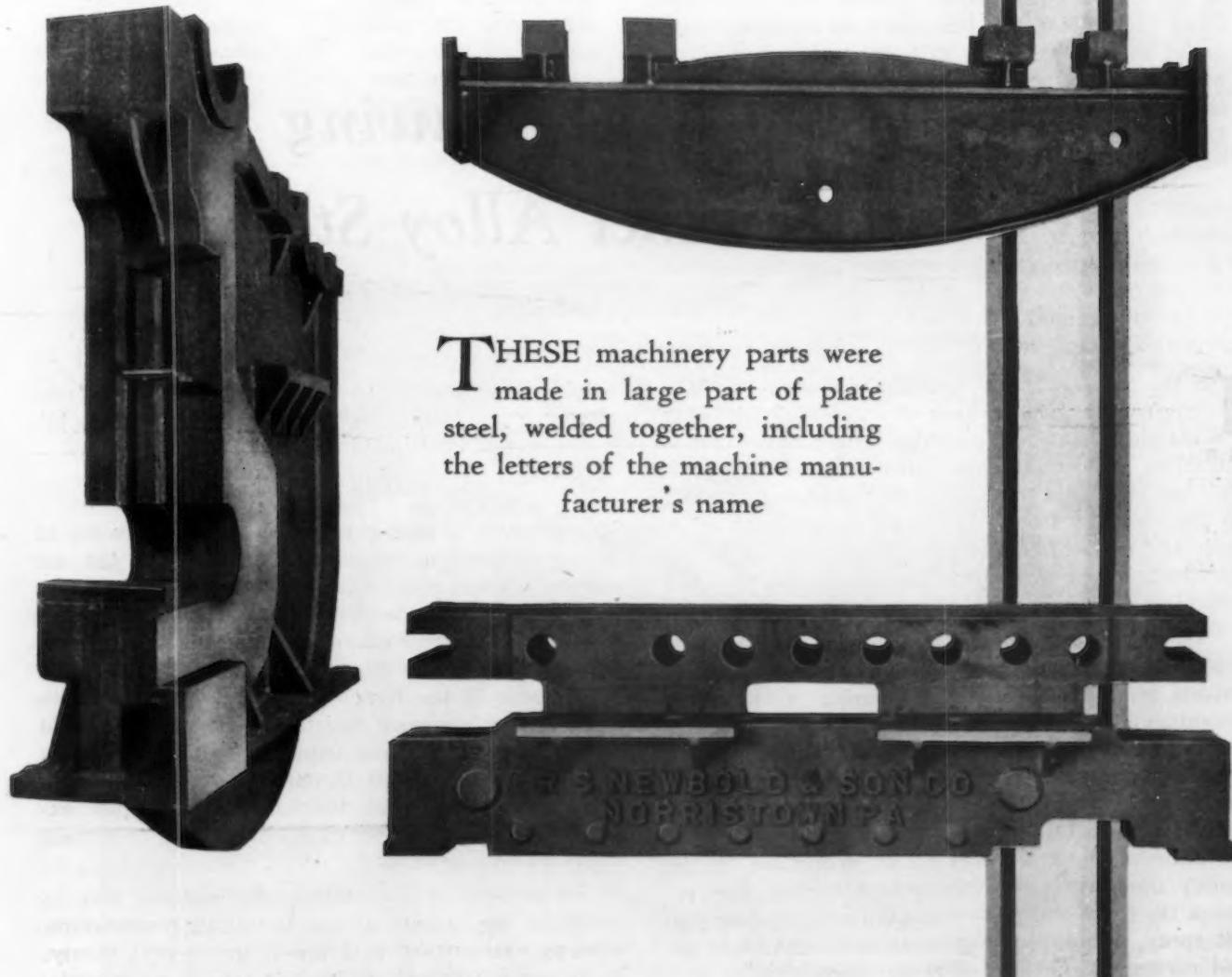
When consideration is given to the fact that a completed machine may involve the production of twenty to fifty separate and different welded steel parts, it is evident that the problem of material handling and operating fixtures becomes complicated.

Welding fixtures, which are as nearly universal as it is possible to make them, offer the best solution we know of at the present time. These fixtures, in combination with overhead and ground movement of material through the production shop, are adequate for present requirements, but we recognize that much remains to be done in this connection.

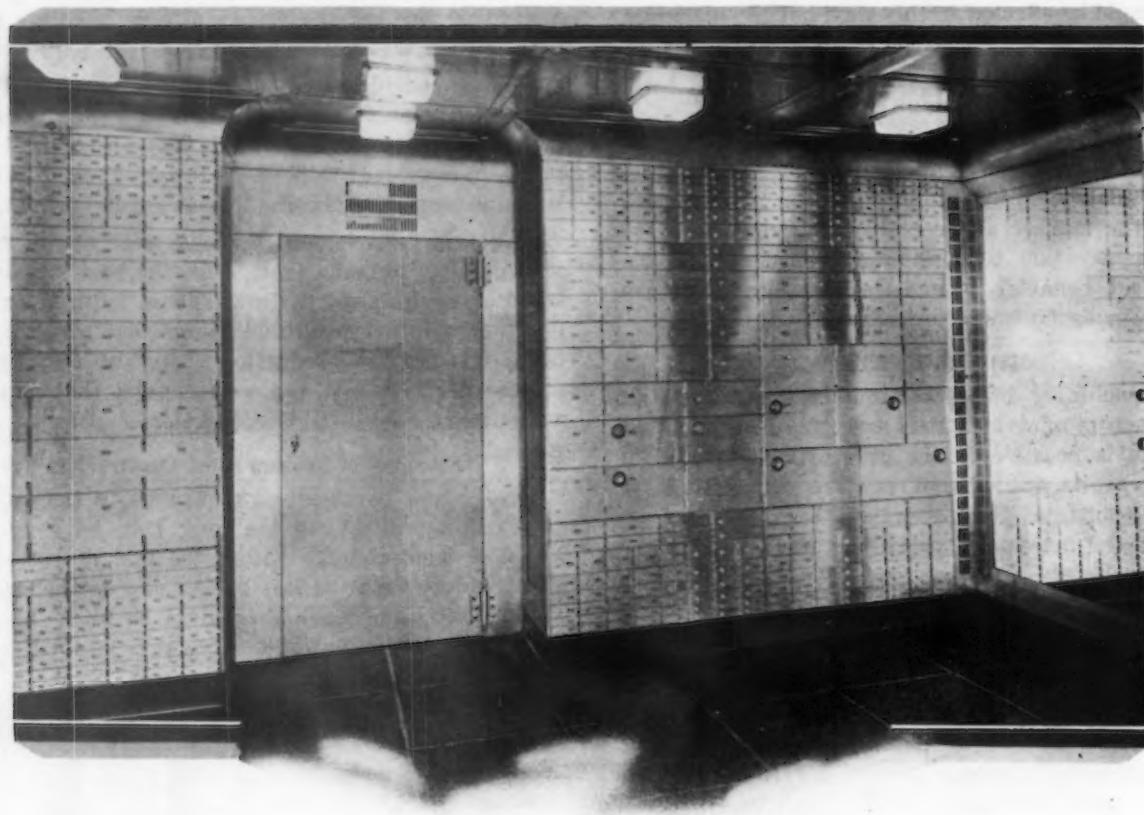
Economy of Welded Steel Construction

Every new development or change in the building of machinery must, in the long run, have a sound economic background. Either the cost of production of machinery must be less by the new method, or the cost of using the machinery must be less. There is no object in making any change which does not satisfy one or both of these two requirements.

(Concluded on page 314)



THESE machinery parts were made in large part of plate steel, welded together, including the letters of the machine manufacturer's name



Pitfalls to Avoid in Drawing High-Chrome-Nickel Alloy Steel

By CURTIS C. SNYDER

IN the past few years the metal industry has been confronted with the task of successfully drawing stainless steels and polishing with a finish that is attractive and at the same time reasonable in cost. This has been a major task, largely because there was no precedent to follow, but rapid progress is being made and much of the credit can be attributed to the introduction and widespread use of the 18 per cent chromium and 8 per cent nickel alloy.

Among the corrosion-resistant alloys of steel, Ka-2, produced in this country under the Krupp-Nirosta patents, lends itself readily to forming, welding and polishing. It contains approximately 18 per cent chromium and 8 per cent nickel, is non-magnetic when annealed and cannot be hardened except by cold working. In hardening by cold working it differs from ordinary steel, becoming harder more rapidly with the same amount of working or reduction. It is readily deep-drawn, may be welded by any method except the forge and possesses maximum resistance to salt spray, atmospheric corrosion and most types of acid corrosion. Certain of these characteristics are

obtained through the patented Krupp treatment consisting of annealing at 1950 to 2150 deg. Fahr., followed by rapid cooling.

Slow Cooling Impairs Ductility

IN the case of thin-gage sheets, after annealing at the prescribed temperature, cooling in the air suffices. If the section is fairly thick, however, No. 10 gage (0.1406 in.) or heavier, quenching in water is usually resorted to for maximum ductility. In no case should Ka-2 be cooled slowly as this will defeat the purpose of the Krupp treatment, impairing both ductility and corrosion resistance. The metal should be held at the annealing temperature no longer than is necessary to soak it through thoroughly, as continued heating at high temperature will cause excessive grain growth, which is detrimental to certain forms of deep drawing.

No pre-heating is necessary; the material may be placed in the furnace at the annealing temperature, it being unnecessary to bring it up to heat slowly. In fact, it is advisable to heat as rapidly as possible.

To obtain the best scaling conditions furnace atmospheres should be neutral or slightly reducing.

Several Pickling Methods Used

FOR removal of either mill or annealing scale, several different methods of pickling are used successfully. Probably the simplest is a 6 to 8 per cent sulphuric acid solution, to which about 10 per cent rock salt has been added, the purpose of the rock salt being to liberate hydrochloric acid. This solution should be used at 130 to 150 deg. Fahr. When the scale has been loosened, the article should be scrubbed and then immersed in a solution of 20 to 30 per cent nitric acid at 130 to 150 deg. Fahr., for 10 to 20 min., after which it should be washed in warm water. The nitric acid dip will whiten the surface of the metal.

Another method is to use 8 per cent sulphuric acid and 2 per cent hydrochloric acid at 130 to 150 deg. Fahr., followed by scrubbing, a nitric acid dip and final washing. One of the best methods is to make a solution, 40 per cent by volume of hydrochloric acid and use it at a temperature of 130 to 150 deg. Fahr. This solution, while slightly more expensive than the others is less likely to cause pitting, and will impart a fine, smooth grain texture to the surface. Inhibitors should be used with all solutions.

The nitric acid tank may be of wood and lined with

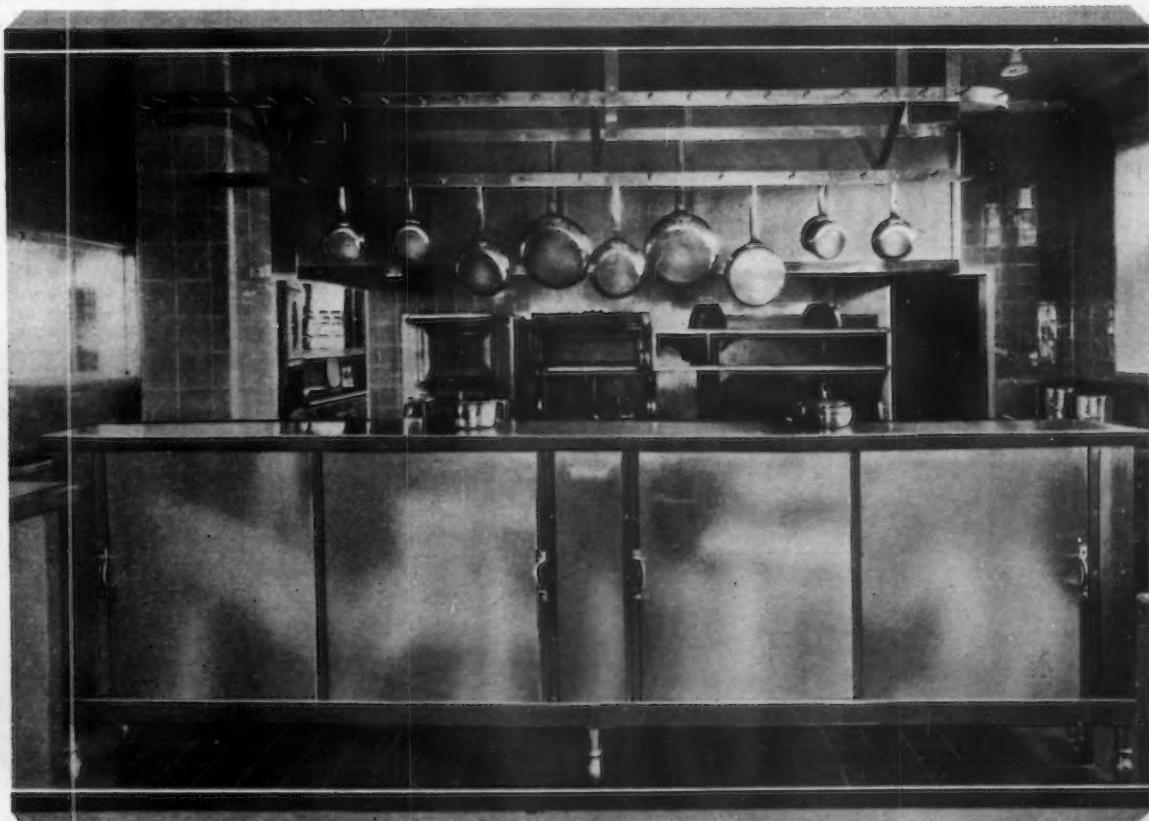
either 16 to 18 per cent chrome or Ka-2 sheets. As nitric acid does not attack the alloy, the life of the tank should be practically indefinite. In the sulphuric and hydrochloric acid

AS the 18 per cent chromium, 8 per cent nickel, alloy of steel has entered into wider use, knowledge of its processing has become increasingly important to the metal worker. While not difficult to draw and finish, it does require different heat treatment, pickling and the use of different drawing compounds from ordinary steel. The author has been engaged in the processing of rustless steel sheets since 1925, having been connected since 1921 with the United Alloy Steel Corporation, later the Central Alloy Steel Corporation, and recently with the Republic Steel Corporation in the metallurgical departments.

tanks a good resistant brick should be used, set with acid resisting mortar, or a steel tank lined with vulcanized rubber. The latter type of tank is proving quite practical and may see widespread use in the future.

In deep drawing, the high-chrome-nickel alloy has a tendency to gall and score the dies unless proper precautions are taken. Ample clearance should be allowed between the metal and the dies, usually twice the clearance provided with ordinary steel or brass. Shops which have allowed 10 per cent of the gage for clearance in drawing ordinary steel sheets have found it necessary to provide a clearance of 15 to 20 per cent of the metal thickness with Ka-2. Chromium nickel

Attractiveness in the bank vaults and utility in the restaurant equipment of the Royal Bank of Canada are provided by the generous use of rustless steel



cast steel dies have been used successfully in drawing this alloy.

Certain lubricants have been developed, which have aided greatly in the rapid strides made in drawing articles of stainless steels. One of these, which the writer has encountered personally is a compound using lithapone as a base, mixed with linseed oil, to which is added a small amount of talc, after which it is thinned, if necessary, with naphtha or benzine. The lithapone is used about half and half with the oil. Lithapone is a compound of zinc oxide and barium sulphate.

Another compound in which lithapone is used as a base is a mixture of lithapone, pale paraffin oil, No. 2 cup grease, flour of sulphur and talc. A third compound, which appears to be a mixture of castor oil and emulsified soap is also efficient and may be readily cleaned from the work by scrubbing with water. This last compound may be thinned with water. The lithapone compounds are all easily removed by washing with gasoline or by a caustic dip followed by scrubbing.

When several operations are required in drawing an article it is at times necessary to anneal between the draws. When this is done a temperature of 1950 to 2150 deg. Fahr. should be used to insure maximum ductility. Presence of any of the three drawing compounds described will have no detrimental effect on the surface of the metal during annealing. If a white or red lead compound is used it is important that it be completely removed before annealing as it has a

rotting action on the stainless alloy as well as on ordinary steel at high temperatures. Disastrous results were encountered many times in the early stages of stainless steel development through the use of lead compounds which were improperly removed before annealing.

In certain cases, where there is excessive drawing on heavy-gage sheets, severe strains are set up as a result of the cold working properties of Ka-2 and precautions must be taken to prevent cracking following the drawing. Cracking may not occur for several hours after and to avoid any possibility of it, the drawn article should be given the annealing treatment at once. No rule for application of this treatment can be made, actual experience being the deciding factor.

The foregoing discussion is not intended to make the handling of Ka-2 appear difficult. The writer has endeavored to include all the necessary operations without omissions, which might make it appear more simple. Stainless steels are here and judged by their widespread acceptance, here to stay and be used in increasing quantities, as mills are able to enlarge their capacities.

In processing Ka-2 three general rules are important to bear in mind: It should be annealed at 1950 to 2150 deg. Fahr. to secure maximum ductility and corrosion resistance; pickling should be by the use of sulphuric or hydrochloric acid, or a mixture of both, followed by a nitric acid dip and thorough washing; and dies should be given ample clearance, and special drawing compounds used.

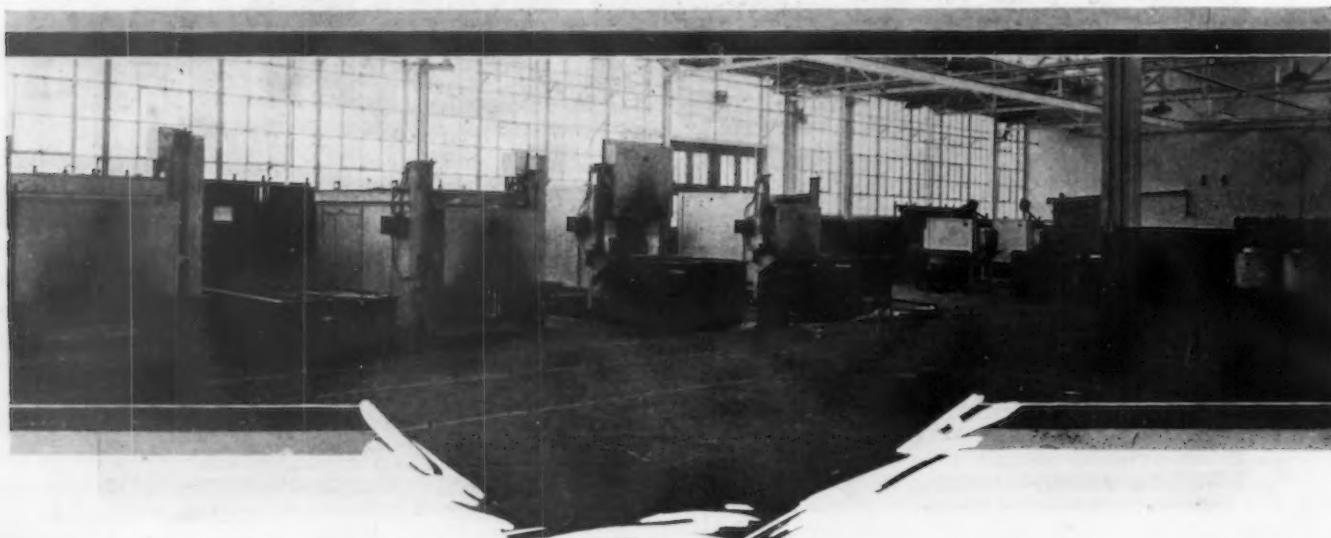
A Model Heat-Treating Room

WHAT is probably one of the finest heat-treating departments in New England and the country is part of the new East Hartford plant of the Pratt & Whitney Aircraft Co. described in *THE IRON AGE* of July 17. There are 10 major electric furnaces, including six carburizing and hardening furnaces, two oil-tempering baths, and two lead-hardening pots. All

are General Electric equipment, of 500 kw. total load.

The equipment is located in a spacious, well-lighted, well-kept room, far removed from the dark and smoky heat-treating regions of yesterday. Production standards are maintained with great exactness. Automatic control makes possible a continual repetition of a predetermined cycle.

Four electric box furnaces provide for general heat treating. In the far corner are two smaller ones and at the end wall are two 12-in. lead-hardening pots.



Balls Ground by Centerless Method

Accuracy High, Finish and Uniform Roundness Maintained on $\frac{1}{4}$ to 4-In. Balls Made of Various Materials

THE finishing of spherical work by the centerless grinding method has been announced by Cincinnati Grinders Incorporated, Cincinnati.

The fundamental principles which apply to all centerless grinding operations are employed, although the arrangement of the regulating or feed wheel differs from the usual procedure. As shown in Fig. 1, the grinding and regulating wheels are both

for roundness are consistently held within 0.0002 in.

Two of the set-ups for ball grinding are illustrated in Figs. 2 and 3. For casein pool balls, Fig. 2, the set-up is simple. The grinding wheel is trued radially and the ball is placed on the work-support blade in the grooved portion of the grinding wheel for grinding. It is interesting to note that the stripe and number of the ball are not affected by the grinding.

Fig. 3 shows an arrangement for grinding 1-in. hardened steel balls on a Cincinnati No. 2 Centerless Grinder. The work is placed on two fingers of the hydraulic loading attachment. Slight movement of the hand in-feed lever shifts an hydraulic valve, thereby lowering the work on to the work rest blade between the grooved grinding wheel and regulating wheel. By continuing the movement of the hand

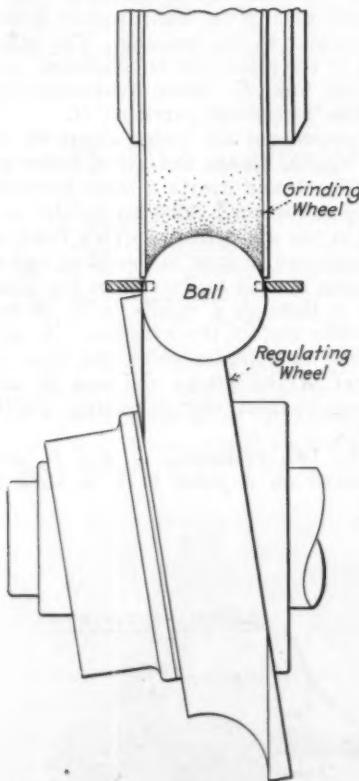


FIG. 1—In Grinding Spherical Work by the Centerless Method the Grinding and Regulating Wheels Are Trued Radially. To generate a true sphere the regulating wheel is mounted on a special collet at an angle to the regulating wheel spindle

trued radially for ball grinding. In order to generate a true sphere on each ball, the regulating wheel is mounted on a special collet at an angle of 12 deg. to the axis of the regulating wheel spindle. This produces a constantly varying inclination of the regulating wheel relative to the grinding wheel axis as the regulating wheel spindle revolves.

Balls of hardened steel, cast iron, Monel metal, glass, casein, hard rubber and bakelite have been ground by the centerless method. In size, these balls have ranged from $\frac{1}{4}$ to 4 in. in diameter. Advantages from the centerless grinding of balls are said to be extreme accuracy, high finish, and uniform roundness. Limits

in-feed lever, the in-feed slide moves toward the grinding wheel for grinding as outlined in the description of Fig. 1.

After grinding, the hand lever is returned to the starting position, the regulating wheel backs away, the hydraulic valve is reversed, and the finished work is lifted from between the wheels to the original position.

On this particular arrangement, the work is manually loaded and unloaded from the fixture, all other operations being automatic. These balls are ground in two cuts, the total stock removal being 0.008 to 0.010 in. Limits for roundness are held within 0.0002 in., and for size, to plus or minus 0.0005 in. with production of 10 pieces a minute per cut being obtained.

A Cleveland branch of the National Die and Special Tool Builders Association has been formed and has elected J. R. Fitzsimmons of the Denly Machine Specialty Co. as temporary chairman. About 80 companies in the Cleveland district, it was reported, are eligible for membership in the branch.

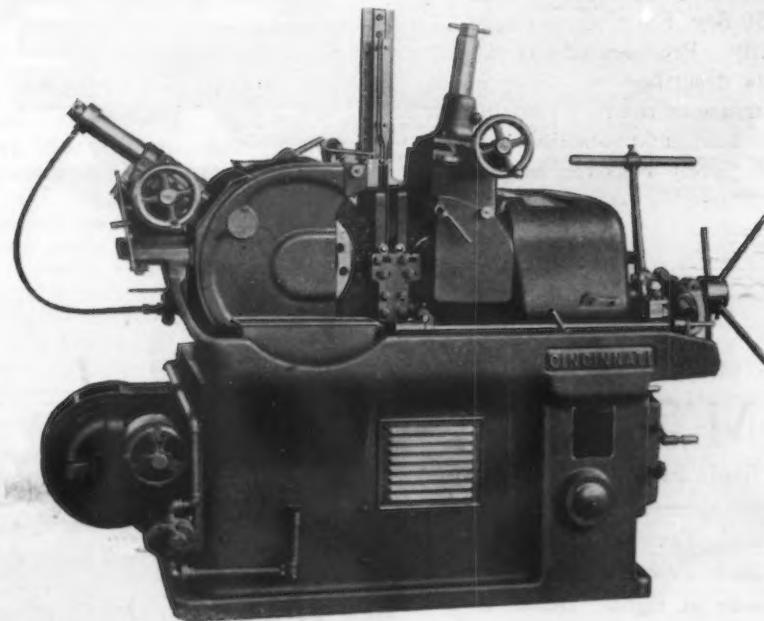
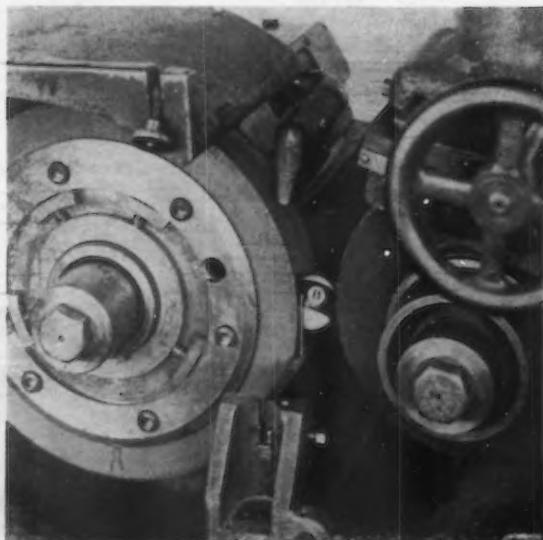


FIG. 2—Set-Up for Centerless Grinding of Casein Pool Balls (Right)

FIG. 3—(Above) In Grinding 1-In. Hardened Steel Balls on This Machine, All Operations Except Loading Are Automatic. Two cuts are taken; total stock removed is 0.008 to 0.010 in.



A Simple High-Production Machine

Lathe with Air-Operated Hydraulic Feed Completes 15 Pieces Hourly in Turning Ends of Axle Housings

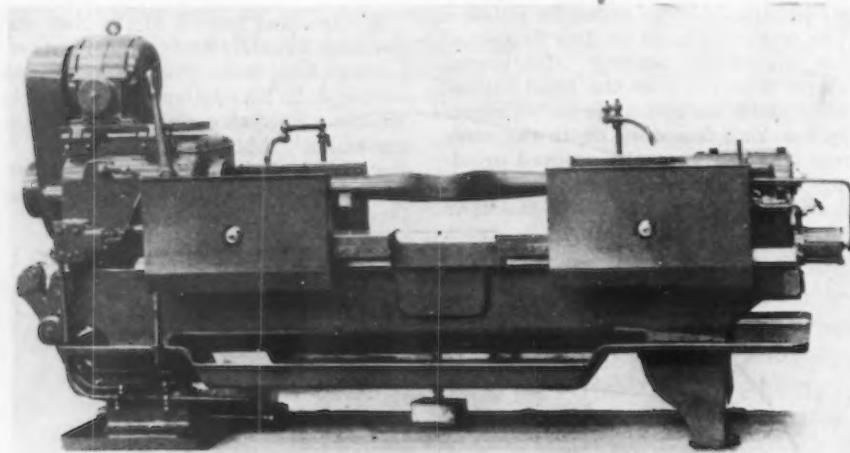
BY A. L. HARTLEY*

To manufacture a machine that is highly productive is the ultimate aim of every machine tool builder. However, the designer is forced to give attention to many other features; he must consider the selling price, maintenance cost, floor space, type of operator that will be required to run the machine, and other details.

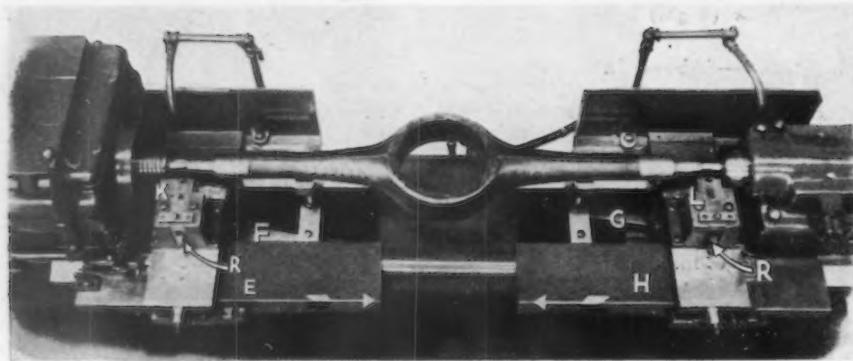
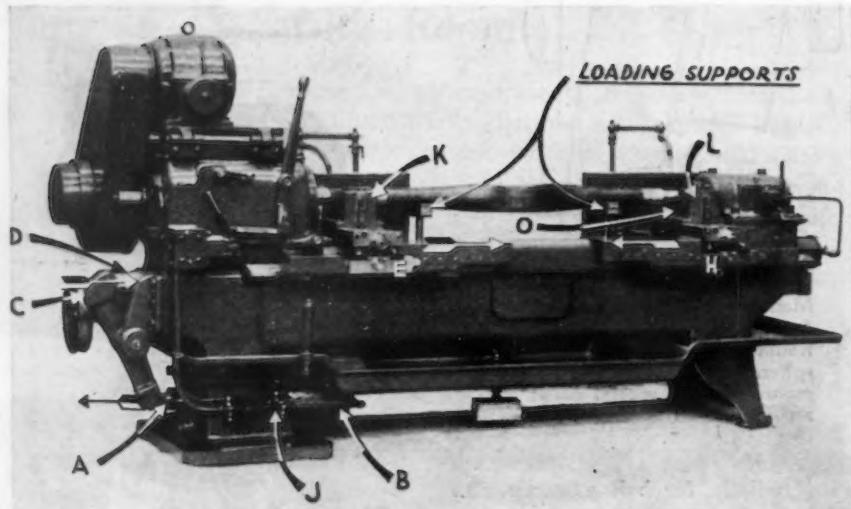
*R. K. LeBlond Machine Tool Co., Cincinnati.

The R. K. LeBlond Co., Cincinnati, recently developed a machine that meets all such considerations in a very satisfactory manner. This machine, a special lathe for turning the end diameters on a banjo housing, is shown fully equipped and ready for operation in Fig 1.

Although very simple in appearance, as may be seen in Fig. 2, this lathe is entirely automatic in its cycle of



MACHINE to Turn End Diameters on a Banjo Housing. It uses an air-operated hydraulic feed with Texrope motor drive. Back view above; operating side at right. Below is a detail showing the tool set-up



operation. The only work required of the operator is to unload, load and start the machine. The feed is automatic, the rapid traverse return is automatic, and the coolant flow is automatic.

To keep this machine from becoming complicated a very simple hydraulic feed mechanism was employed. The mechanism consists of an oil cylinder, A, Fig. 2, with an air cylinder, B, mounted in tandem with it. The piston in the air cylinder is connected to a piston in the oil cylinder by means of a connecting rod which passes through a packing gland. The oil cylinder piston is coupled in turn to the lever C. This lever is pinned to a link D which drives the front carriage E. The front carriage actuates a second link, F, Fig 3, which is connected to a pivot link directly below the center of the housing. The other end of the pivot link is connected to a fourth link, G, which transmits the motion to the tail carriage, H.

Compressed air under about 60 lb. per sq. in. enters the air cylinder at B, Fig. 2, and exerts a total pressure of approximately 3000 lb. on the piston in the air cylinder. This force is transmitted in turn to the oil cylinder, causing the oil to flow from the head end A through a needle valve to the opposite end of the cylinder. By adjusting the needle valve the rate of travel of the piston rod can be adjusted to suit the operating conditions.

The two cylinders, A and B, are mounted on a pivot at J in such a

manner that they are free to turn in a vertical plane. As the rod is forced out in the direction shown, the front carriage travels toward the tailstock. The direction of motion is reversed and transmitted to the tail carriage by the system of links previously described. That is, as shown in Fig. 2, the carriages travel toward each other when they are feeding.

When the carriages reach the end of their cut the spindle and coolant flow are stopped automatically and the flow of air to the air cylinder is reversed. Since there is an open line

for the oil to return from tail to head end of the oil cylinder the carriages return at a suitable traverse speed.

The axle housings are made from very light weight material and it is not practical to use multiple tooling. For that reason a profile plate is mounted in a special slide on the cross-slide of each carriage. These plates are held stationary relative to the bed by means of links which are clamped to the bed.

The bottom slides of both carriages are equipped with two rollers, a fixed roller which rides on the inside of the profile plate and a roller under spring tension which rides on the outside of the plate. These rollers cause the tool blocks *K* and *L*, Fig. 3, to follow the profile of the master plates. The profile plates are designed so that the small diameters on each end of the housing are turned and the tools are

withdrawn the proper distance and the large diameters turned.

To prevent the work being scratched as the tools travel back to the loading position the tool blocks are mounted on pivots, as shown at *O*, Fig. 2. The gravity center of the tool block is back of the center *O* and the bearing *R*, Fig. 3, is cut away enough to allow the tool point to be 0.005 in. away from the work. When the cut starts the force of the cut automatically pulls the tool back to the cutting position.

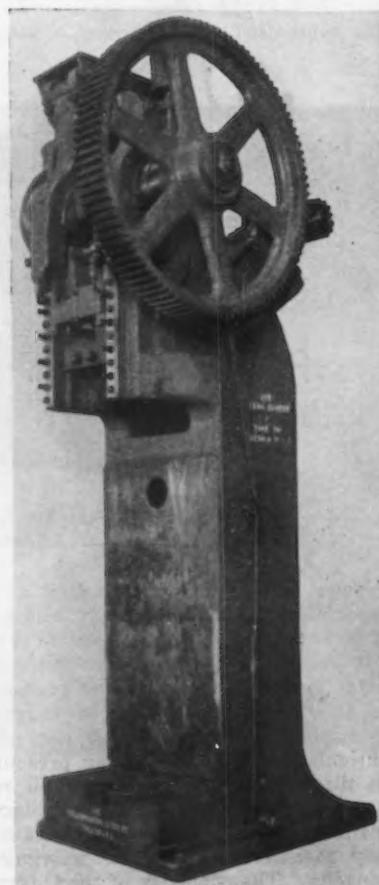
The machine is equipped with a three-speed Timkenized geared head, Texrope motor drive, extra large roller bearing, air-operated tailstock and a 5-hp. motor.

A cut $7\frac{1}{2}$ in. long is taken from each end of the pressed steel housing. The small diameter is $2\frac{1}{4}$ in. and the large diameter is $3\frac{1}{4}$ in. Production of 15 parts an hour is being obtained.

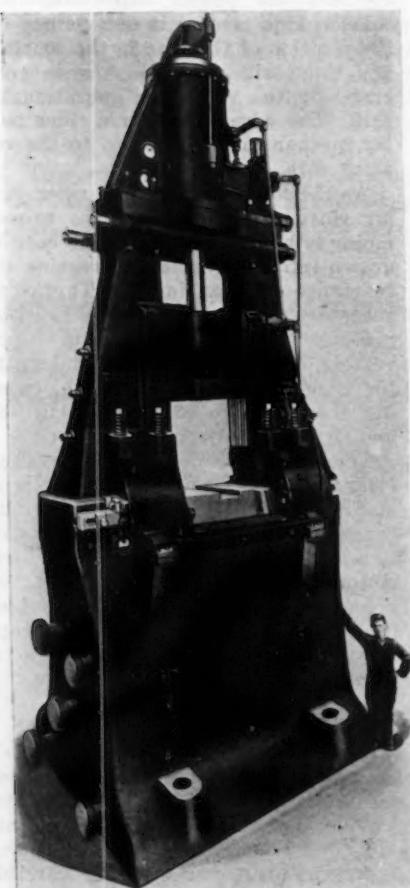
is the regular four-cycle type, $2\frac{1}{4}$ in. bore and $2\frac{1}{4}$ in. stroke. It has a high-tension magneto and uses standard motor-cycle spark plugs.

Horning and Wiring Press Has Unusual Die Height

IN the horning and wiring type of press illustrated, which was built recently by the Toledo Machine & Tool Co., Toledo, Ohio, the distance from the top of the bed to the gibs is more than 72 in. The total height of the press is 170 in. The frame is a heavy single steel casting of substantial cross section. The press has an 8-in. stroke



Distance from Top of Bed to Gibs Is More Than 6 Ft.



8-In. Flange Gate Valves Are Forged from 2000-Lb. Billets on This Steam Drop Hammer

ALTHOUGH rated at 25,000 lb., the actual weight of the ram, rod and piston of the steam drop hammer illustrated is 27,000 lb.

This machine, built by the Erie Foundry Co., Erie, Pa., for the Henry Vogt Machine Co., Louisville, Ky., is believed to be the largest ever built. It stands 35 ft. 6 in. in height. The sow block measures 60 in. from front to back, and the die space in the clear

between guides, is 52 in. The ram measures 54 in. from back to front. The press has a 32-in. cylinder, with piston rod 11 in. in diameter. Shipment of the machine required special railroad facilities; a wrecking crane and crew were needed to handle the enormous anvil block, which, weighing 250 tons, was made in two sections.

The machine is credited with producing one of the largest die-forgings ever made, an 8-in. flange gate valve for 900-lb. pressure. This was forged from a 2000-lb. billet, and the finished forging weighed 1750 lb. The overall length of the finished forging was $31\frac{1}{2}$ in., the height 24 in., and the diameter of the flange $18\frac{1}{2}$ in.

Development of this hammer is felt to mark an important step in the progress of drop forging. Improved features developed by the company to secure greater accuracy are incorporated also in this machine. These include positive guide alinement, which eliminates ram binding and assures a full-weight blow; V-type sow block, which seats tighter in the anvil with every blow from the ram; extended box section frame, which provides increased strength and maximum bearing area; and a motion valve that stops steam leakage and waste.

Gas-Engine Drive for Pipe Threader

PPIPE can be cut and threaded, using gasoline-engine power, on the No. 412 "Power Boy," made by the Oster Mfg. Co., Cleveland. The new gasoline-engine drive will operate for 10 hr. on a single gallon of gasoline.

It is claimed that the new gas-engine Power Boy combination is just as portable as the regular Power Boy with electric motor drive, the weight being only a few pounds more. The engine is a 1 hp., single-cylinder, air-cooled Briggs & Stratton motor. It

and is controlled by positive jaw clutch. It is powered with a 5-hp. motor mounted on the top of a frame and geared direct to the back-shaft.

The horning and wiring type of press either with or without a screw adjustable swinging knee originally was built in comparatively small sizes, primarily for horning and wiring pieced tinware and similar work as well as for simple blanking, forming and piercing or perforating operations. However, the uses of presses of this type have increased materially and the Toledo company is now building 15 sizes either with or without gearing weighing from 1300 to 40,000 lb. in standard patterns, as well as machines with numerous modifications. The weight of the press illustrated is 25,000 lb.

Hydraulic Broaching Machine

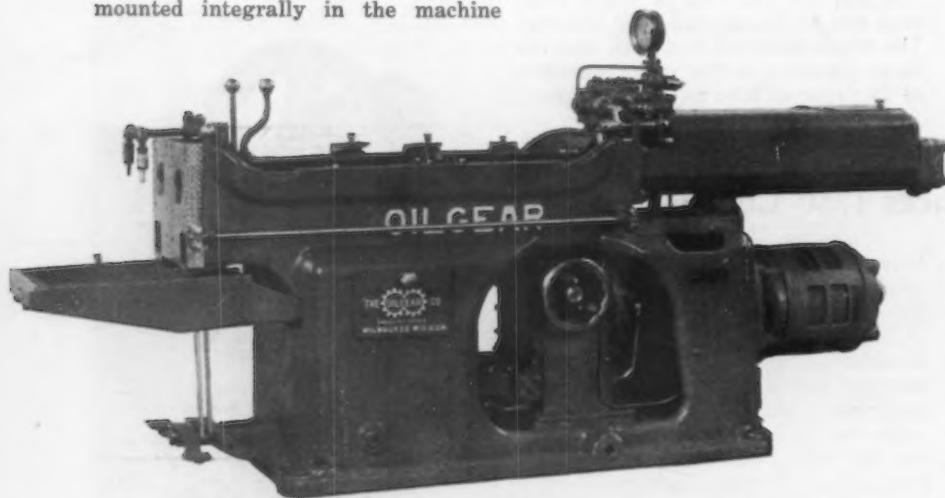
New Oilgear Unit for Small and Medium Size Work Has Higher Pulling and Return Speeds

STURDY construction, convenient control, higher pulling and return speeds, and closer limits for finished parts are features of the Twin-Twelve horizontal broaching machine which is being placed on the market by the Oilgear Co., Milwaukee. This machine differs considerably from the company's Twin-Ten which it supersedes.

The power unit consists of an Oilgear WG-6 variable-delivery pump mounted integrally in the machine

stopping of the heads. An adjustable cam stops the drawheads automatically at the end of the predetermined stroke. The stroke of the heads may be changed conveniently to suit the work and the tools.

The particular machine illustrated has the combined automatic and manually-operated control. The automatic control permits continuous operation of the drawheads. Change



Twin-Twelve Oilgear Broaching Machine with Combination Automatic and Manual Control

frame. The pump is operated at a maximum speed of 860 r.p.m., and has a maximum oil delivery of 4800 cu. in. per min. at a working pressure of 1000 lb. per sq. in. Its peak pressure is 1250 lb. per sq. in. The Oilgear multiple plunger pump delivers a pulsationless flow of oil under pressure in direct proportion to the pull required for broaching, and oil displacement is practically positive against any resistance up to the maximum capacity. The efficiency of the Oilgear pump at full stroke and load is said to be 90 per cent.

The pump, machine, work and tools are protected against overload by automatically-operated relief and bypass valves. Working parts of the pump, which is simple and compact, are flood lubricated under high pressure. Heavy thrusts are carried on roller bearings and all parts are accessible. A handwheel on the pump controls the amount of oil delivered and the speed of the drawheads.

Either a simple manual control or a combined automatic and manually-operated control can be provided. The broach control is conveniently located and gives the operator free use of both hands to serve the machine. The manually-operated unit has a double foot treadle at the front for starting or reversing the drawheads at any point of the stroke; a hand lever on the control rod at the front of the machine also permits starting and

from semi-automatic manual to full automatic merely requires loosening a screw, pulling out a small detent pin and setting a control valve. A control lever on the side of the broach frame starts and stops the motion of the drawheads. The control mechanism operates a valve which reverses the flow of oil from the pump to the cylinders, the oil flowing directly from the valve to the cylinders through cored passages. The automatic unloading valve which opens and stops the machine the instant the maximum capacity is reached is flanged to the control valve.

The draw-heads are screwed on to the ram and guided by Ampco bronze liners on large flat hardened steel ways. They can be adjusted 1 1/4 in. above or below the center-line of the ram. The cast cylinders are accurately machined, and the pistons are fitted with cast-iron piston rings. The piston rod stuffing boxes are packed with Garlock material. The frame provides a large reservoir for coolant, which is delivered to the broaches by a belt-driven gear pump at the rate of 14 gal. a minute.

Normal and peak load pulling capacities of the machine are 12,000 and 15,000 lb., respectively. The stroke is adjustable from 6 to 36 in. and the pulling speed from 48 to 396 in. per min. The machine is driven by a 10-hp. constant speed motor equipped with mounting flange as shown, or

it can also be furnished with a motor mounted on a bracket at the rear of the machine.

Floor space of 32 x 120 in. is occupied, and the net weight of the motor-driven machine is approximately 4900 lb. Special equipment adapted for this machine includes a sliding broach support, with legs, broach clamping fixtures, and countershaft for belt drive.

Thyratron Tubes Maintain Tension of Wire Reel

VERSATILE Thyratron tubes, recently applied to the control of theater light dimming, have found another application in the shops of the General Electric Co., Schenectady. Wire produced in the wire drawing shops there must be kept at proper tension as it is reeled. This tension is maintained by the use of Thyratron equipment.

The wire passes from a large reel through the wire drawing equipment, where it is drawn down to the desired size, thence to a small spool, where it is re-reeled. As the wire is drawn at a constant rate, the speed of the re-reel spool must be constantly decreased as the effective diameter of the surface on which the wire is wound increases.

The re-reel spool is driven by a small direct-current motor, power being supplied to the motor armature by Thyratron tubes. A small reactor controls the power supply by the tubes. This control is determined by the position of the core in the reactor, and the position of the core is governed by the re-reeling operation itself. The wire runs over a rider pulley mechanically connected to the reactor core.

As the loop on which the rider pulley rides decreases when the re-reel motor is running too fast, the core is drawn into the reactor, increasing its reactance and causing the Thyratron tubes to pass less current and so causing the motor to slow down. Conversely, if the loop increases in length, the reactor core is withdrawn, causing the tubes to pass more current and so increase the motor speed.

Very little work is done by the rider pulley. The reactor core weighs but a few ounces, while the current controlled by the Thyratron tubes can be sufficient to control the speed of a motor of several horsepower. In the present installation the tubes control the armature current to a 1/4-hp. motor, with the field excited from a separate source of direct current.

Independent Pneumatic Tool Co., Chicago, will open a branch sales office on Aug. 1 at 6200 East Slauson Avenue, Los Angeles. A complete line of Thor electric and pneumatic tools, as well as spare parts, will be carried in stock. Vernon Job, formerly manager of the San Francisco office, will be in charge and will be assisted by B. J. Herron.

Machine for Rolling Heavy Metal Forms

Closely Spaced Pairs of Rolls, Operating Successively and Quickly in Forming Cornices and Other Sections

MACHINES for forming heavy sheet metal into window framing, cornice molding, door butts and the like have been of the "brake" type, operating on the principle of a press. Roll machines have been used only for comparatively narrow strips of light metal, as in making furniture hardware and similar articles. J. S. Thorne Co., Philadelphia, however, has recently had built by Dienelt & Eisenhardt Co., of the same city, a metal-forming machine which will roll 10-gage material up to 36 in. wide.

This machine consists of 12 pairs of horizontal rolls, between which the strips of metal pass. These rolls are so shaped that the metal is progressively molded into its final shape, the impressions becoming sharper and deeper as the material passes through the machine, thus permitting sharp angles without breaking at the bends, which might occur if the material were formed too much by a single set of rolls.

All operations are mechanical, beginning with the flat material and ending with the finished product. No intermediate rehandling and readjusting are required between impressions, as would be necessary with a brake machine.

Speed of travel is approximately 65 ft. a minute. The machine occupies a floor space of 8 ft. 4 in. by 22 ft. 6 in., or of 13 ft. 4 in. by 22 ft. 6 in., in a duplex machine of double capacity.

To prevent wide and heavy material from rising and buckling between the rolls, the forming rolls are set close

together, the horizontal center distances being only 16 in.

In handling heavy-gage material narrower than 36 in., it is desirable that the bearings of the rolls be moved inward to reduce roll deflection. This is accomplished by making the bearing housings or supports movable upon the base plate, and by bushing the rolls so that the bearings can run at any point desired. One photograph shows the outer housing of the second pair of rolls removed, while the housings of the other rolls have

been shifted inward by varying distances.

Vertical clearance between rolls is adjustable by means of hand wheels on the bearing housings, which are fitted with gages. Individual rolls are removable.

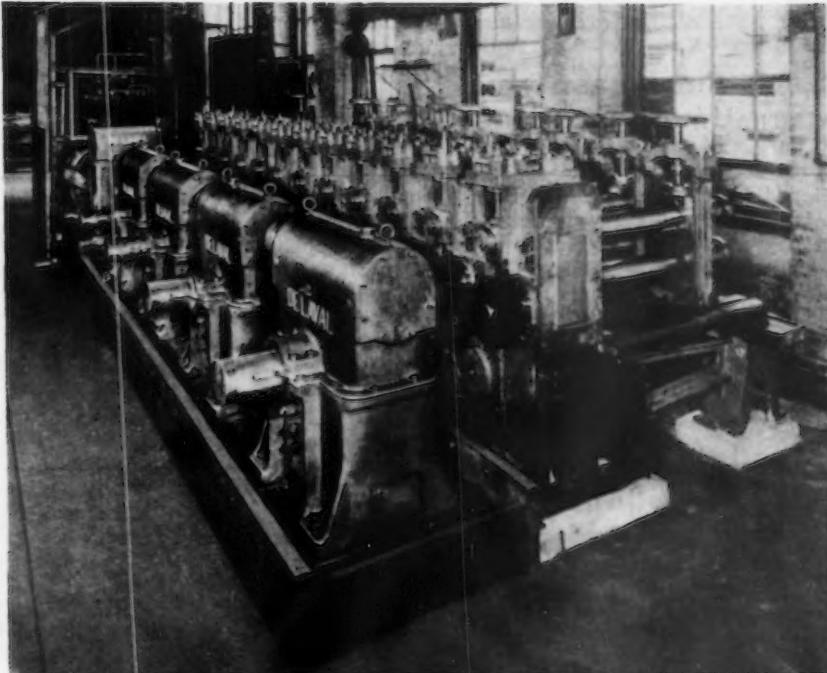
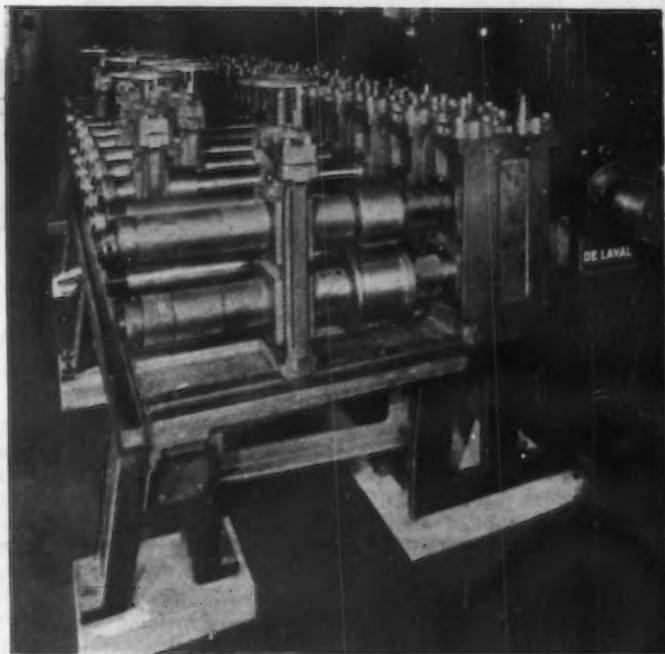
The rolls are geared together by intermeshing spur gears in four groups of three, each of which is driven from a top drive 17½-ratio worm reduction gear. The worm spindles are coupled together to form a continuous longitudinal line shaft. The motor shaft, which runs at 860 r.p.m., is not directly connected to the line of worm spindles, but drives it through a helical reduction gear of 2.03 ratio.

The worm wheel shaft of each worm gear is extended upon both sides, thus

M E T A L -
F O R M -
I N G
M a c h i n e ,
w i t h
D r i v e
a t
L e f t
T h r o u g h
H e l i c a l
G e a r
f r o m
M o t o r
a t
F a r
E n d
a n d
I n d i v i d u a l
D r i v e s
o f
S e c t i o n s
T h r o u g h
W o r m
G e a r s
(B e l o w)

* * *

R o l l S e t s i n
M e t a l - F o r m i n g
M a c h i n e H a v e
A d j u s t a b l e
O u t e r B e a r i n g s ,
a s S h o w n a t
R i g h t , t o R e d u c e
D e f l e c t i o n



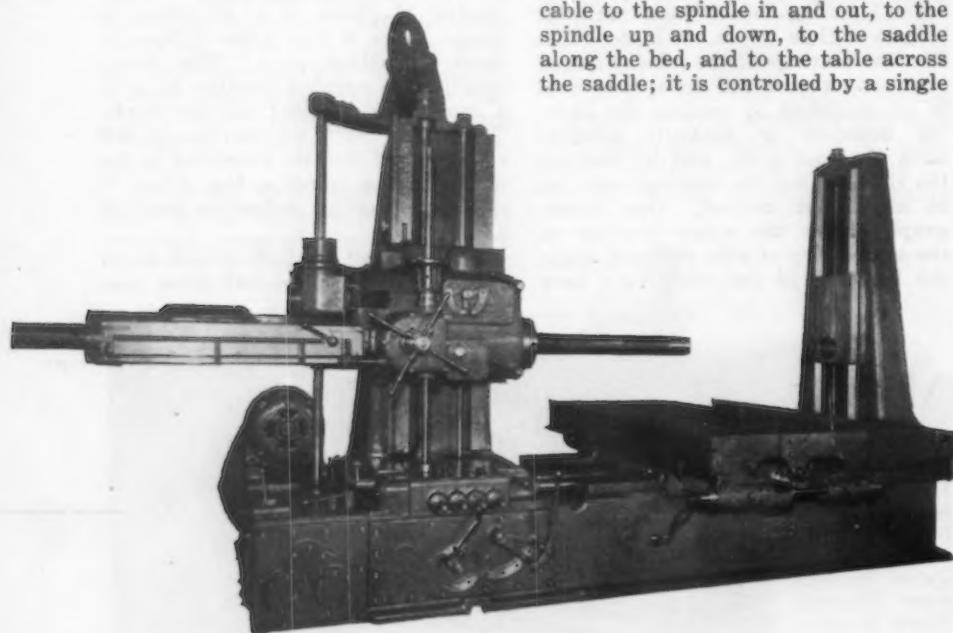
providing for the installation of a duplicate row of rolls on the opposite side of the worm gears. The 175-hp. motor is sufficiently powerful to operate both sets, although ordinarily only one side will be in use, while the other side is being set up. In case of very long runs, however, both sides can be used to obtain double output.

Houghton to Build Plant in England

E. F. Houghton & Co., Third, American and Somerset Streets, Philadelphia, manufacturers of oils and leathers for the industries, will build a small plant in England, according to an announcement by Major Aaron E. Carpenter, first vice-president, who recently returned from abroad. The site has not yet been selected, although two locations, one in Liverpool and one in Manchester, are being considered. The company already has plants in France and Germany.

Boring Machine Has Anti-Friction Bearings

LIBERAL use of anti-friction bearings, permitting high spindle speeds and eliminating radial and end play on spindle and all fast moving shafts, is a feature of the horizontal



Generous Use of Timken and Other Anti-Friction Bearings, Together with a Selection of 24 Spindles, Speeds and Feeds, Adapt the Machine for a Wide Range of Work

boring, milling and drilling machine here illustrated.

The machine is produced by the Jones Machine Tool Works, Inc., 5300 Lansdowne Avenue, Philadelphia. Its spindle is an alloy steel forging accurately ground the entire length. The feed to the spindle is by screw and nut, and a safety stop and automatic knock-out is provided to prevent jamming. Safety stops are also furnished for the table and saddle. The spindle sleeve, also a steel forging, is mounted on large-diameter Timken roller bearings. It has a simple adjustment for wear and can be easily kept in proper running condition. All spindle driving shafts and all fast moving shafts are made of alloy steel and are mounted on ball or roller bearings. Shafts in the feed and speed gear boxes are Timken-bearing equipped.

Twenty-four changes of speed and feed to the spindle are obtainable. All feeds, speeds and movements can be reversed instantly through a twin disk clutch without stopping the machine. Speed and feed gear boxes are splash lubricated, a centralized force-feed system being used for all other bearings on the machine.

The bed is a massive box-type casting, well ribbed. The bed ways are proportioned to provide ample bearing for the saddle. The saddle in turn is made very long and the table is therefore well supported in its extreme front and rear position. Bed, saddle and table were designed to eliminate overhang. The column, also

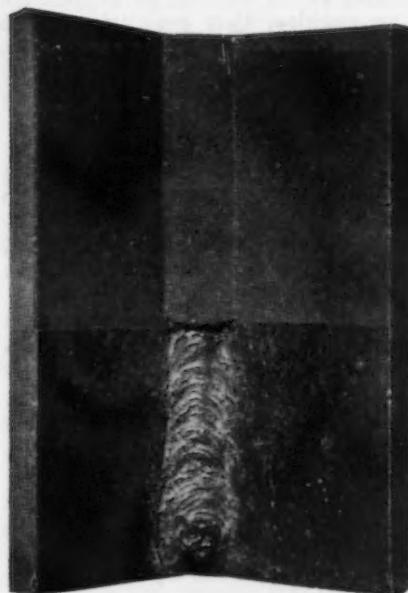
of box-section type, is large at the base, and is keyed, bolted and doweled to the bed. The spindle saddle has a long bearing on the ways of the upright.

Feed and rapid traverse is applicable to the spindle in and out, to the spindle up and down, to the saddle along the bed, and to the table across the saddle; it is controlled by a single

guard, and at the ends, where it is punched for riveting into the stringers. Six slots are also cut through the tread so as to provide adequate drainage of rain or snow water when the device is installed out of doors. It is believed to be the only self-draining fire escape tread on the market, and has been approved by the Industrial Board of the Pennsylvania Department of Labor and Industry.

Fillet Putty for Welded Joints

FILLET putty is being offered to manufacturers of welded machinery and equipment by the Fusion Welding Corporation, 10257 Torrence Avenue, Chicago. The purpose of this putty is to cover weld beads and to give them a smooth finish. The appearance of welded products has kept many companies from using welding



lever directly in front of the operator.

All actuating screws are of extra large diameter and are provided with micrometer dials graduated to read in 0.001 in. Gears are of alloy steel, heat treated; they have stub teeth, are of coarse pitch and have extra wide faces.

Provision is made for the application of a vertical milling attachment, which may be ordered with the machine or supplied later.

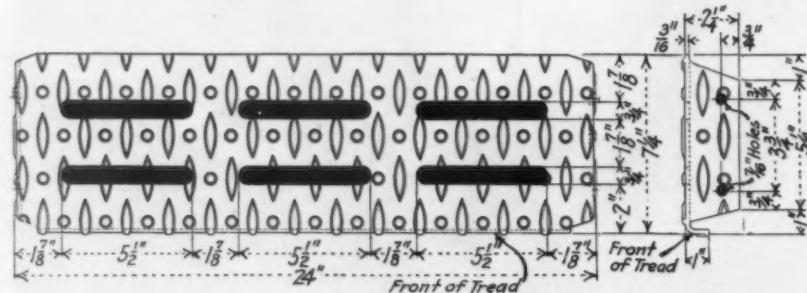
Safety Fire Escape Tread

CENTRAL Iron & Steel Co., Harrisburg, Pa., has developed and is now marketing a stair tread, especially designed for fire escapes. The treads are stamped and pressed from the "Knobby" non-skid floor plates, rolled at the company's Harrisburg mills. As shown by the drawing the tread is flanged down in front for a toe-

to its full extent, as it was often difficult to evolve the graceful lines given to products employing castings.

It is said to be possible by the use of Weldite fillet putty to benefit by the use of welding and still retain, and in many cases improve upon, the appearance of castings. This putty is easily applied to weld beads in any type of joint or position.

It is furnished in powder form, to be mixed with water to any degree,



Safety Tread Designed for Fire Escapes

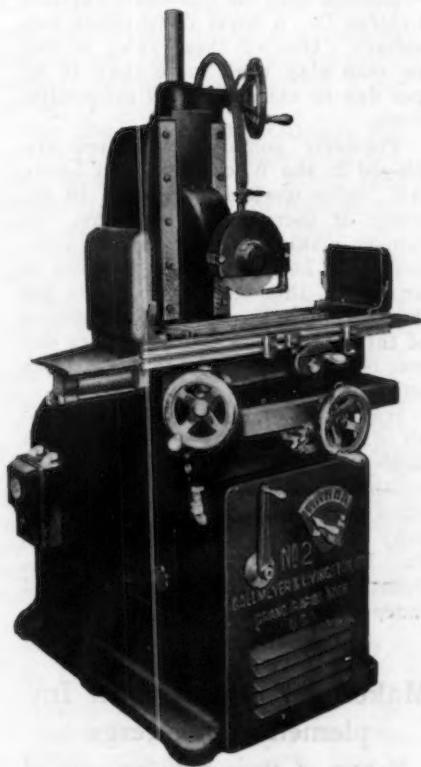
from paste for applying with some smooth instrument, such as a putty knife, to a consistency thin enough to be applied with a brush. Very little practice is required to enable one to apply this putty smoothly.

A short time after being applied,

Weldite fillet putty is said to become substantially as hard as iron, as it is essentially iron. Some eight months of commercial use has shown its ability to adhere tenaciously, and not to loosen from shock or vibration, it is asserted.

High-Speed Surface Grinder Has Hydraulic Feed

HYDRAULIC drive of the table is the primary difference between the new No. 2 surface grinder of Gallmeyer & Livingston Co., Grand Rap-



Rapidity of Operation and Freedom from Shock at Reversal Are Features Claimed for This Hydraulically Operated Grinder, with Table and Cross-Feed Both Driven by Hydraulic Power

ids, Mich., and other small grinders. This No. 2 machine, as illustrated, has a working surface of table 6 x 18 in. The company states that surface grinder work can be produced at high table speeds with quality of finish and accuracy of product fully equal to that produced with mechanical feed and slow table travel.

Moving the control lever on the front of the base at upper right corner gives a wide variation in speeds, from zero up to 60 ft. or more a minute. Cross-feed can be varied from 0.01 in. to $\frac{1}{8}$ in. and this can be made to operate at either end of the stroke or at both ends, as desired. Cross-feed operates hydraulically also.

When the automatic hydraulic feed is in operation the handwheel and pinion for hand operation of the table are entirely disengaged. Thus, the smooth working of the hydraulic drive is not impaired. To operate the machine by hand the piston rod

connected to the table is disconnected. Thus, the hand movement has no drag upon it and power is applied by a spiral pinion, giving maximum smoothness of hand operation.

Base and upright ways for the head are made in one heavy casting. This gives rigidity and permanence of alignment between spindle bearings and table. The base is large enough to house the motor, the hydraulic pump with its control valve and the oil tank with its supply for hydraulic operation.

As the head ways are carefully protected from dust and dirt, there is less than the usual danger of sticking. A practically perfect balance is said to obviate danger of the head "hanging up" and then dropping too far. As the elevating screw is directly cen-

tral between the side ways, side cramping action is eliminated. The weight of the head at rear of the ways, plus the weight of the idler jack, transmitted to the head by the downpull of the belt, almost exactly balances the weight of the head forward of the ways. This eliminates cramping from front to back.

Although the photograph shows the machine arranged for wet grinding, but with the front and rear table splash guards removed, it can be furnished also for dry grinding. A dust collecting system can be had with it. Standard wheel is 8 in. diameter by $\frac{1}{2}$ in. face. The spindle, however, is large and rigid enough to permit variations. The machine can grind work $9\frac{1}{2}$ in. thick under the 8-in. wheel. Cross-feed of $6\frac{1}{2}$ in. permits a $\frac{1}{2}$ -in. wheel to clear the working surface of the table on both sides.

Tests, it is stated, have shown that there is no more wheel wear in taking a given depth of cut on a given material at high speed of table than at slow table travel. The makers claim that actual grinding work can be done in approximately one-quarter the time required with mechanical feed. They point particularly to the minimum shock at point of reversal, due to the hydraulic operation.

Heavy-Duty Grinders with Motor Mounted at Rear

HIGH-SPEED heavy-duty grinders having the motor at the rear instead of below are being placed on the market by the Kling Brothers Engineering Works, 1300 North Kostner Avenue, Chicago. Designated as the series T, the machine is made in three sizes, with wheels ranging from 18 in. x 2 in. to 30 in. x 4 in.

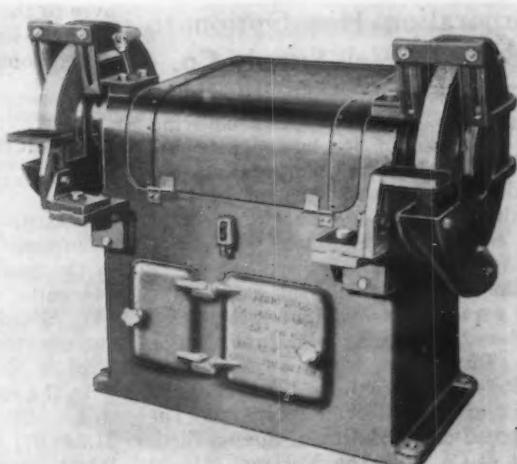
Easy access and more accurate adjustment, making for quicker belt changing, longer belt wear, less vibration and less maintenance are claimed for the general construction.

Other features include the split wheel-shaft connected by a bolted coupling which can be removed conveniently to facilitate replacement of V-belts. Another convenience is the

simple and quick speed change sheave arrangement, which requires the removal of only one nut. A safety device is provided to prevent operation of the wheels at higher than the recommended speeds. This device consists of a cam and lever movement, actuated from the spark guard to the control arms located under the motor base.

When, due to the wheel wear, spark guards are lowered the control arms are also lowered, permitting the motor base to slide forward and making possible the mounting of the next size of sheave. The spark guards cannot be raised for mounting new wheels until the motor is brought back to slow speed position.

HIGH-SPEED Grinder Designed for Rough Grinding and Snagging Steel, Malleable and Gray Iron Parts



Foundries Find Business Diminishing

Slowing down of the gray iron industry during June is indicated by the monthly report of the Gray Iron Institute, Inc., Cleveland. Production by 162 foundries during June was 24,178 tons of good castings. This was 73.7 per cent of normal production, compared with 81.7 per cent in May and with 113.2 per cent in June last year.

New business received during the month, as shown by reports from 83 foundries, indicated 58.4 per cent. May was on the basis of 67.3 per cent and June last year was 98.9 per cent. Unfilled orders June 30, as shown by reports from 78 foundries, were 40.5 per cent, compared with 45.6 per cent at the end of May and 76.5 per cent at the end of June last year.

Foundries in New England, New York, New Jersey and Canada, 48 reporting, turned out 78.4 per cent of their normal production during June. Pennsylvania, Michigan, Ohio, Indiana and territory to the south and west of Mississippi River, 59 reporting, operated at 76.9 per cent of normal. Wisconsin, Illinois and the entire territory west of the Mississippi, 55 foundries reporting, operated at 71.5 per cent.

Reports on business outlook were less favorable than at the end of May. Of 135, one stated that the business outlook is good, 62 said fair, 57 said poor and 15 bad.

Cleveland Merger Forms Ferro Enamel Corporation

The Ferro Enameling Co. and the Ferro Enamel Supply Co., Cleveland, have merged as the Ferro Enamel Corporation. The former company has been engaged in the manufacture of porcelain enamel frit and liquid porcelain enamels and the latter in marketing these enamels and in designing and equipping plants for porcelain enameling. The executives and heads of departments of the two companies will function in substantially the same capacities in the new corporation.

Corporation Has Option to Buy Oil Well Supply Co.

The Oil Well Supply Co., Pittsburgh, has given an option covering the purchase of its business to the United States Steel Corporation, according to an announcement by Benjamin F. Harris, president of the supply company. The option will expire on Aug. 25.

Since 1928 the Oil Well Supply Co. has served as a distributor in the oil regions for Spang, Chalfant & Co., Inc., Pittsburgh, which owns approximately one-fourth of the common stock of the Oil Well company. The proposed consolidation of Spang, Chalfant & Co. with the National Supply Co., which is in a similar line of busi-

ness to the Oil Well company, has made a change necessary.

At the same time the National Tube Co., subsidiary of the United States Steel Corporation, which formerly distributed its oil country products through the National Supply Co., will be left without a distributor, and thus logically seeks an outlet through the Oil Well Supply Co.

Ohio Foundrymen to Meet at Cincinnati Aug. 13

The Ohio Foundries Association will hold its fourth sectional conference at Cincinnati Aug. 13. W. H. Geier, foundry division Cincinnati Milling Machine Co., will be the general chairman. The vice-chairmen will be: William Gilbert, Buckeye Foundry Co., Cincinnati, B. I. Kauffmann, Edna Brass Co., Cincinnati, Edwin B. Hausfeld, vice-president Ohio Pattern Works Co., Cincinnati, and E. L. Brooks, Sawbrook Steel Casting Co., Cincinnati.

Michigan Steel Changes to Diversify Sheet Products

The Michigan Steel Corporation, Detroit, manufacturer of sheet steel, which has under way an improvement program at its plant at Ecorse, Mich., will increase its productive capacity 30 per cent and likewise effect substantial savings in operating costs. The objective is a straight line routing of work in process which will eliminate much handling of the semi-finished product and augment plant capacity by more efficient use of space already available. For example, it is estimated that 15 finishing mills can be reduced to 10, which will be able to turn out 30 per cent more material than the original 15.

The five mills eliminated by this change will be used for the production of sheet steel for metal furniture, stoves or other articles, thus giving the company a business of greater diversification. Heretofore the company has devoted almost all of its capacity to sheet steel for automobile bodies, hoods and fenders. Changing over to the new system has been partly done and is expected to be completed some time this fall.

Shipments of Small Electric Locomotives

WASHINGTON, July 25.—Shipments of mining and industrial locomotives in the quarter ended June 30 totaled 141 units, valued at \$677,749, against 140, valued at \$968,157, in the previous quarter, according to the Department of Commerce.

In the second quarter of 1929 there were 207 units shipped, valued at \$1,248,071. Only five units, in the latest quarter, were industrial, all the others being for mining use.

Cement Company Abolishes 12-Hr. Day

Final elimination of the 12-hr. working day, involving shorter hours for men on that schedule and giving employment to others, has been worked out in the plants of the Universal Atlas Cement Co., according to B. F. Affleck, president.

Mills that were owned by the former Atlas company came under United States Steel Corporation rules through the purchase of the Atlas Portland Cement Co.'s properties and business in January and their consolidation with the Universal Portland Cement Co., a Steel Corporation subsidiary. One of these rules is that no man may work more than 10 hr. per day or more than six consecutive days.

Formerly some of the men employed in the Waco, Tex., and Leeds, Ala., mills worked more than 10 hr., many of them 12 hr. per day. As cement making is a continuous process which keeps the kilns burning 24 hr. a day, this meant two shifts per day, except in the shops. Substitution of three instead of two shifts per day was completed on July 15, Mr. Affleck announced.

Institution of the 8-hr. basis placed all of the company's mills on the same working hour basis. In addition to the plants at Waco and Leeds, other plants are operated by the company at Hudson, N. Y., Northampton, Pa., Universal, Pa., Buffington, Ind., Duluth, Minn., Hannibal, Mo., and Independence, Kan.

Makers of Small Farm Implements to Merge

Merger of three manufacturers of small farm implements is being effected with the American Fork & Hoe Co., Cleveland, as a nucleus. Other companies that will join the combination are the Kelly Axe & Tool Co., Charleston, W. Va., and the Skelton Shovel Co., Dunkirk, N. Y. The three have combined assets of about \$20,000,000. Terms of the merger provide for an exchange of stock. The capitalization of the new company will be 40,000 shares of the first preferred stock, \$100 par, and 500,000 shares of no par common stock.

The new company will be known as the American Fork & Hoe Co. with headquarters in Cleveland. The present American Fork & Hoe Co. has 13 plants located in the East, Central West and South. It is expected that economies in both manufacturing and distribution will be effected by the merger. George B. Durell is president and general manager of the American Fork & Hoe Co.

The Gray Iron Institute will hold its third annual convention Oct. 8 in the Terminal Tower Building, Cleveland, instead of on Oct. 15, as originally set.

British Unemployment Grows

High Percentage Among Welsh Mills—Shipbuilding Slack and Steel Export at Low Level—Sponge Iron Process Tested

(By Cable)

LONDON, ENGLAND, July 28.

UNEMPLOYMENT is specially serious in Wales with 30 per cent unemployed in Glamorganshire and 28 per cent in Monmouthshire. Further decline in employment is expected.

The London Electric Railways has placed an order with Cochrane & Co., Ltd., Middlesbrough, for 35,000 tons of cast iron segments for tube extensions, enabling the Cargo Fleet Iron Co., Ltd., to restart a blast furnace recently blown out.

Steel mills are in need of regular orders for ship steel, but apart from a few large vessels placed recently new shipbuilding is extremely slack. The Peninsular & Oriental Steamship Co. has placed contracts for two 14,500-ton vessels for Far Eastern service with Alexander Stephen & Sons. Harland & Wolff, Ltd., will build a sister ship to the White Star motor liner Britannic and expect to employ about 5000 men until early in 1932.

Sponge Iron Process Satisfactory

The Duffield Iron Corporation, operating a patented process for sponge iron production by low-temperature reduction, reports that a trial run gave entirely satisfactory heat conditions. Upon charging with a mixture of pulverized coal and iron ore, the gas produced was more than sufficient for the retort furnace requirements. This, the company claims, establishes that sufficient gases are generated in this reaction to supply all the heat necessary in making the

Unemployment in Wales Ranges from 28 to 30 Per Cent and is Growing.

* * *

Construction of Sister Ship to Britannic Will Engage 5000 Men Until 1932.

* * *

Germany to Erect Rhine Bridge 1000 Meters Long at Wiesdorf.

* * *

Boycott of German Products Threatened by Dutch Because of New Tariff Policy.

sponge iron. The test is said to have revealed that the mechanism of the process needs improvement, but the principle is capable of definite establishment.

British Mills Seek Canadian Order

Finished steel business here is dull and heavy mills are operating only part time. British makers are hoping to secure a share of the steel work for a new Canadian railroad station believed to be planned for Montreal. Export demand is generally quiet and domestic requirements are lessening on the approach of the holidays.

Only 28 Northeast Coast blast furnaces are operating, which is sufficient for current requirements. Domestic and export demand for Cleveland pig iron is very poor with buyers expecting lower prices.

Tin plate is quiet, as consumers are

still hoping for lower prices despite the intention of mills to make no alteration in the minimum quotation. It is still expected, however, that Welsh steel will be reduced as a result of reductions in Continental steel prices. Tin plate inquiry is fair, suggesting that orders may be placed in the near future. Galvanized sheet inquiry has improved, but business placed aggregates only a small tonnage and many mills are still closed. Japanese interest in light-gage black sheets is still limited.

Steel Sales Cartel Formed

The Continental selling cartel for semi-finished steel and beams has been formed and operates from Aug. 1. Billets have been reduced 7s. (\$1.70) per ton, sheet bars, 5s. (\$1.22) per ton, and beams 5s. 6d. (\$1.34) per ton. British consumers are still apathetic despite the price reductions, as they are unable to secure sufficient orders for their own products.

The German syndicate has sold large tonnages of mild steel bars at £4 10s. per ton (0.91c. per lb.), f.o.b. Antwerp, and the market is now firmer. Plates, however, are weak with sellers accepting orders for 3/16-in. plates at £5 15s. per ton (1.22c. per lb.), f.o.b. Antwerp.

Belgian output in June was 265,000 metric tons of pig iron, 244,000 tons of raw steel and 205,000 tons of rolled products. German production in June was 859,000 tons of raw steel and 603,000 tons of rolled products.

French Obtain Electrification Contract

The Credit General des Petroles, Compagnie Generale d'Electricite and

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at \$4.8665 (par)

British Prices f.o.b. United Kingdom Ports

Ferromanganese, export.	£11 10s.	\$55.95
Billets, open-hearth.....	5 15 to £6 5s.	27.98 to \$30.41
Black sheets, Japanese specifications.....	12 5	59.61
Tin plate, per base box..	0 18 to 0 18 1/2	4.37 to 4.39
Steel bars, open-hearth..	7 15 to 8 5	1.69 to 1.79
Beams, open-hearth.....	7 7 1/2 to 7 17 1/2	1.60 to 1.71
Channels, open-hearth.....	7 12 1/2 to 8 12 1/2	1.66 to 1.87
Angles, open-hearth.....	7 7 1/2 to 7 17 1/2	1.60 to 1.71
Black sheets, No. 24 gage	9 15 to 10 0	2.12 to 2.17
Galvanized sheets, No. 24 gage	11 17 1/2	2.57

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phosph.	£2 17s. to £3 0s.	\$13.86 to \$14.60
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Billets, Thomas.....	4 13	to 4 14	22.63 to 22.87
Wire rods, low C., No. 5 B.W.G.	6 2	to 6 4	29.69 to 30.19
Rails, light.....	6 0		29.20
Black sheets, No. 31 gage, Japanese.....	11 5	to 12 12	54.68 to 58.32 Cents a Lb.
Steel bars, merchant.....	4 11	to 4 12	0.91 to 0.92
Steel bars, deformed.....	4 10	to 4 11	0.90 to 0.91
Beams, Thomas, British standard.....	4 19 1/2	to 5 0 1/2	1.10 to 1.11
Channels, Thomas, American sections.....	5 12	to 5 14	1.24 to 1.26
Angles, Thomas, 4-in. and larger, over 3/4-in. thick.....	5 6		1.17
Angles, Thomas, 3-in.....	5 7 1/2		1.18
Hoop and strip steel over 6-in. base.....	5 0	to 5 8	1.10 to 1.18
Wire, plain, No. 8 gage.....	6 12 1/2		1.43
Wire, barbed, 4-pt. No. 12 B.W.G.	10 12 1/2		2.30
Wire nails, base.....	6 7 1/2		\$1.42 a keg

Union des Mines, with the backing of the Banque Blair, have obtained the contract for electrification of Poland, following rejection of the Harriman plan.

The German railroads propose to erect a new Rhine bridge, 1000 meters long, at Wiesdorf, to be completed in 1934.

Dutch farmers and manufacturers are protesting at the new German tariff policy and threatening to boycott German imports into Holland.

Japan's Galvanized Sheet Exports Grow

YOKOHAMA, JAPAN, June 14.—Efforts to increase exports of galvanized sheets have been successful and, following development of this trade by Mitsui & Co. and the Mitsubishi Shoji Kaisha, both the Tokiwakai works and Kawasaki Dockyard Co. have joined in the effort to make this development permanent in Japan's export trade. The Kawasaki company is understood to be considering installation of its own galvanizing equipment.

As yet, exports of galvanized sheets are small, with a total in May of only 4184 tons, the greater part of which went to South Sea markets, Kwantung Province, Siam and China. Russia, Manchuria and British India were also substantial buyers in May.

Price Control End by Cartel Brings Low Prices

BERLIN, GERMANY, July 17.—The Continental Steel Cartel has passed through another crisis by abandoning price control, which was being widely ignored by its membership. Although the 10 per cent reduction of output is adhered to, production of member mills is well below the total permitted, as a result of the general depression of trade.

Failure to establish selling syndicates for certain products by July 31 is generally attributed to the Forges de Clabecq in Belgium, a strong company, independent of banking influences. This producer is believed to have succeeded in preventing the plan by demanding an excessive quota.

At the recent meeting, when price control was abandoned by the cartel, the German members urged the abandonment, claiming that Belgian mills were underselling the cartel minimum price schedule by quoting steel at c.i.f. prices instead f.o.b. port and including ridiculously low ocean freight rates.

Some measure of success of the cartel plan for control of prices and selling syndicates appears possible, however, as selling offices are to be established for semi-finished material and beams. Furthermore, removal of price control on steel bars, bands, heavy sheets and other products will bring the market well below a profit-

able level in the present period of keen competition for business, which is expected to bring a more favorable attitude toward control by the various producers.

Since abandonment of cartel control, quotations have sagged to unusually low levels in the export market. Steel bars are quoted as low as £4 15c. a ton (1.05c. a lb.), f.o.b. Antwerp, hot rolled hoops at £4 18s. a ton (1.08c. a lb.), and heavy-gage sheets have declined about 12s. (\$2.92) a ton. Although beams will be controlled through a selling syndicate, operative Aug. 1, the price is down to £4 14s. a ton (1.04c. a lb.), f.o.b. Antwerp, which is 7s. 6d. (\$1.82) a ton less than the official fixed price will be when this product is controlled. Buyers, however, exhibit small interest in covering their requirements, evidently having little faith that the selling syndicate on this product will be able to exercise complete control and prevent direct sales at lower prices.

British Welding Plants Are Merged

LONDON, ENGLAND, July 14.—Control of Alloy Welding Process, Ltd., Ferry Lane, Walthamstow, E. 17, has been acquired by Murex, Ltd., producer of alloy steels and carbon-free metals. The plants of the Premier Electric Welding Co., Ltd., and Thermit, Ltd., will be removed to the shops of the newly acquired company, which were completed about 18 months ago.

Wire Rod Cartel Ineffective

HAMBURG, GERMANY, July 15.—Although the Wire Rod Cartel is still nominally in existence it is no longer effective. In the past week an important interest began selling wire rods to Japan at £6 15s. (\$32.84) a ton, c.i.f. Japanese port, equivalent to £5 2s. 6d. (\$24.94), f.o.b. Antwerp. The official price of the Wire Rod Cartel is £6 5s. (\$30.41) a ton, f.o.b. Antwerp. Quotations by wire rod sellers to the United States are \$32 to \$33 a ton, c.i.f. Atlantic or Gulf ports.

River Shipments of Steel High in June

Shipments of steel products on the Ohio River in the Pittsburgh district during June amounted to 144,099 net tons, according to the United States Engineer office, Pittsburgh. This compares with 128,502 tons in May, and 116,679 tons in June, 1929. It is the second highest monthly total to be reported, having been exceeded only by movement of 150,163 net tons in September, 1929.

River commerce in steel products on the Monongahela River amounted to 137,603 tons in June, compared with 117,942 tons in the preceding month, and with 116,157 tons in June, 1929. The June, 1930, total on this river has

been exceeded only by shipments of 143,238 tons in November, 1928.

Allegheny River steel shipments in June were 700 tons, compared with 722 tons in the same month last year. There was no movement in May, 1930.

Canadian Pig Iron Output Off, Steel Up in June

TORONTO, July 28.—Production of pig iron in Canada in June amounted to 66,081 gross tons, a decline of 18 per cent from the 80,505 tons produced in May and 27 per cent less than the 89,873 tons reported for June, 1929. The decline from May was due to lower output of basic and malleable grades. Basic iron dropped to 45,349 tons from 56,636 tons in May, and no malleable iron was reported for the month, as against 12,636 tons in May. Foundry iron, however, rose to 20,732 tons from 11,387 tons in May.

For the half year ended June 30, the production of pig iron totaled 451,186 tons, compared with 518,557 tons in the first six months of 1929 and 468,013 tons in the corresponding period of 1928. This year's output included 318,563 tons of basic iron, 93,249 tons of foundry iron and 39,374 tons of malleable.

Production of ferroalloys in June, at 11,059 tons, was the highest monthly output on record, having been 42 per cent over the 7766 tons reported for May and 60 per cent greater than the 6933 tons made in June, 1929. For the first half of the year production totaled 44,960 tons, against 40,951 tons in the corresponding period of 1929.

Production of steel ingots and direct steel castings for June amounted to 95,321 tons, a gain of 4 per cent over the 91,692 tons of May, but 20 per cent under the total of 119,505 tons made in June last year.

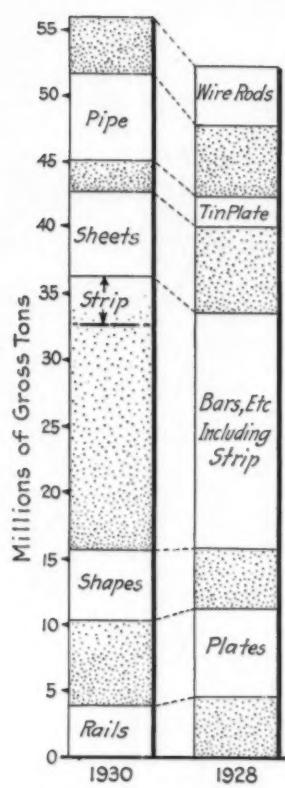
For the six months ending with June, production of ingots and castings totaled 628,993 tons, against 738,842 tons in 1929 and 648,338 tons in the first half of 1928.

Steel Piling Bought for French Harbor

A contract for 16,000 tons of Larsen sheet steel piling has been placed in Germany by the Ponts et chaussées, Département du Nord, Service Maritime, Dunkerque, France. The piling is for construction of walls of lock chambers, levee protection, fenders, wharves and foundations of buildings in the harbor of Dunkerque. About 6000 tons of box sections and 10,000 tons of standard sections will be used in lengths up to 75 ft.

Poole Engineering & Machine Co., Baltimore, have appointed Neil Otey, formerly of the main office, as district manager of its Pittsburgh Office, 245 Union Trust Building.

Large Expansion in Steel Rolling Mill Capacity



Capacity Has Increased Heavily for Bars and Strip, as Well as Pipe, While Rails Declined

There has been something of a redistribution of some of the other districts, St. Louis having passed the Eastern district (principally New England and Northeastern New Jersey), leaving the latter smallest of all, while Ohio River capacity has passed the Western district, including the Pacific Coast. The Valley district has gone ahead of Philadelphia by a small margin.

Present available capacity is represented by the figures in the table on this page, while the diagrams show how the products and the districts divide up

PRODUCTIVE capacity of the steel rolling mills in the United States, as of about Jan. 1 last, was 55,902,200 gross tons, compared with 52,196,000 tons as of Jan. 1, 1928. (See *THE IRON AGE*, Aug. 2, 1928, page 272). The gain in two years was 7.1 per cent. These figures come from analysis of the rolling mill capacities of individual steel companies, shown in the 1930 directory of the American Iron and Steel Institute.

Some products have shown a decided shrinkage. Thus, capacity for rolling rails has declined from 4,530,000 tons to 3,864,000 tons, a drop of nearly 15 per cent. Wire rod capacity has dropped 3 per cent and there have been small declines in both plates and sheets.

To offset these, pipe capacity has increased 19.6 per cent, mainly in seamless lines; bar and strip capacity (combined) has gone up 15.7 per cent, mostly in strip; and capacity for rolling steel shapes has increased 18.3 per cent. There was a small increase in tin plate capacity.

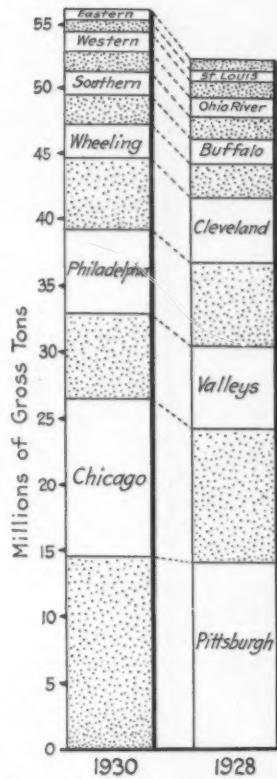
Compared with two years ago Chicago has made a distinct gain on other districts. The Chicago territory's tonnage increase was about 18 per cent, and its percentage of the total has gone up from 19.39 in 1928 to 21.36 in 1930. Meantime the Pittsburgh percentage dropped from 26.91 to 26.11 though the tonnage increased 6.2 per cent. Advances of between 14 and 15 per cent were made by both the Cleveland district and the much smaller St. Louis district. Developments around Detroit were largely responsible for Cleveland's advance.

the total tonnage capacity of the United States.

Most of the larger districts have well diversified lines. When we come to the smaller districts, however, this is not true. The Ohio River is tied up heavily with sheet. Nearly half of the Buffalo capacity is in bars; the same is true of the Western district (west of Missouri River). Cleveland is the only one of the large districts which lacks rolling capacity for structural shapes and also for tin plate. The Valley district is the only large one having no rail capacity.

Capacity for Making Finished Rolled Steel Products
(Thousands of Gross Tons)

	Total	Rails	Plates	Shapes	Bars, etc.	Strips	Sheets	Tin Plate	Pipe	Wire Rods
Pittsburgh	14,594	726	2,010	1,635	4,095	362	1,007	550	2,905	1,304
Chicago	11,939	1,309	1,545	1,129	3,949	939	599	468	932	1,069
Valleys	6,440	—	682	152	1,939	535	1,094	511	1,267	260
Philadelphia	6,331	600	1,566	1,539	1,222	57	395	204	408	340
Cleveland	5,533	90	203	—	2,242	533	1,224	—	752	489
Wheeling	2,547	—	103	—	118	850	657	586	233	—
Buffalo	2,207	275	95	520	1,000	—	132	—	—	185
Southern	1,758	484	102	125	730	—	99	—	—	218
Ohio River	1,427	65	—	—	217	—	1,035	—	—	120
Western	1,423	315	18	173	690	—	76	36	—	115
St. Louis	931	—	107	40	411	125	89	68	55	36
Eastern	762	—	—	—	343	196	—	—	30	193
Total	55,902	3,864	6,432	5,312	16,956	3,597	6,407	2,323	6,582	4,329



Chicago and Cleveland Showed Gains Much Greater Than Those of Other Districts

This Issue in Brief

Appearance of welded machinery members has a bearing on customer acceptance. The pleasing lines of a well-designed casting are sometimes imitated, in seeking the elusive buyer's dollar.—Page 290.

Steel castings make longer trains possible. Ability of the material to withstand punishment held a primary factor. Cast steel car couplers form a case in point.—Page 279.

Chicago is gaining on Pittsburgh as a steel center. Advanced from 10,126,000 tons capacity in 1928 to 11,939,000 tons now, while the Smoky City gained less—14,044,000 tons to 14,594,000 tons.—Page 305.

Automotive scrap reaching limit of open-hearth capacity to handle. Takes three times as long to charge as does heavy scrap and causes much loss of tonnage.—Page 312.

Knowledge of slag and metal relations essential to fast production of steel. We must learn how to control furnace conditions, if we are to avoid vexatious delays.—Page 289.

Favors welded steel machinery parts in place of castings. Speed of operation a factor, while ease of material handling, the "neck of the bottle," has been attained through use of suitable equipment.—Page 291.

Why the bonus and how much? The much-discussed Bethlehem Steel case affords a topic of widening interest with respect to the extent and reasons for the practice.—Page 277.

A by-product of the Congressional investigation of Soviet activities in the United States is a recanvassing of the various conditions under which American-Russian business is carried on. A fog still lies over the situation.—Page 312.

Six times as many tons of copper now produced as of aluminum. But in 1913 the ratio was 13 to 1 and it is falling fast. On volume basis, aluminum may soon be in the lead.—Page 288.

High-chrome-nickel alloy steel is not difficult to draw and finish, once one knows how. But it requires a different heat treatment and pickling, and different drawing compounds, from the ordinary.—Page 293.

Motor efficiency not the primary factor in applying electricity for power. Improvement in quality of product, or greater quantity, may follow.—Page 282.

Expansion in rolling mill capacity has not been uniform. Comparing 1930 with 1928, reductions are shown in rail capacity and a few other items, while seamless tubes, strip steel and bars have gone up rapidly.—Page 305.

Good engineering essential in using steel castings successfully. Abrupt changes in section must be avoided; also thick corners, where several members meet.—Page 281.

How much can a man really earn? Payment for exceptional services may involve a huge sum, and questions of fairness to stockholders often have a bearing.—Page 278.

Hardening by cold working operates faster and more heavily on high-chrome-nickel alloy steel than on more usual grades.—Page 292.

Wrought iron and hard steel hold their strengths better at high temperatures than does mild steel. At 1900 deg. Fahr. wrought iron has 10.2 per cent left of its initial strength; mild steel, 8.3 to 8.6 per cent; steel with 1 per cent carbon, 10.8 per cent.—Page 282.

Methods of paying bonuses for exceptional service vary widely. Some companies have standard rates on a sliding scale. Few men may participate, or many.—Page 277.

Wrought aluminum alloys strong as steel. Tensile strengths up to 70,000 lb. now obtained, greatly enlarging possibilities of usefulness of the metal.—Page 285.

The infant American manganese ore industry has supplied about 5 per cent of the metallurgical needs of the past four years. Soviet dumping is charged.—Page 313.

Further Sharp Drop in Exports

June Showed Smallest Movement in Four Years—
Changes in Import Classification and Split
Month Preclude Exact Comparisons

WASHINGTON, July 25.—Amounting to only 159,392 gross tons, exports of iron and steel products from the United States in June were the lowest since February, 1926, when they were 157,187 tons. They were, however, within 10 per cent of the showing of several months in 1927. Compared with May, there was a decline of 36,728 tons, or approximately 19 per cent.

It may be noted that exports of scrap, though making a new six-month record by more than 10 per cent, were lower in June (except for

last September) than they have been since February, 1929. Meantime our exports of finished steel were the lowest for any month since February, 1925.

In the first six months, 1930 exports were 1,225,001 tons, a drop of 366,802 tons, or a little more than 23 per cent. from last year. Stated in another way, the decline has been at a daily rate of more than 2000 tons, compared with the outgoing shipments in the first six months of last year.

The slackened movement is attributed to the world-wide depression and

is reflected in exports from all important steel-producing countries. It has been pointed out that the new tariff, whatever its merit or lack of merit, cannot be reasonably assigned as the cause for a situation which set in long before the tariff was enacted.

Canada took only 60,299 tons in June, against 87,060 tons in May, while in the first six months exports to Canada declined to 474,461 tons, from 674,873 last year.

Imports are shown only through June 17, since it was on that date that the Fordney-McCumber tariff act ex-

Exports of Iron and Steel from the United States (In Gross Tons)

	June	Six Months Ended June		
	1930	1929	1930	1929
Pig iron	1,000	3,106	9,171	30,795
Ferromanganese	1,163	104	5,276	1,013
Scrap	35,808	44,990	278,445	252,078
Pig iron, ferroalloys and scrap	37,971	48,200	292,892	283,886
Ingots, blooms, billets, sheet bar	1,675	4,199	14,230	31,238
Skelp	7,239	13,674	55,168	53,795
Wire rods	4,479	2,774	25,851	23,060
Semi-finished steel	13,393	20,647	95,249	108,093
Steel bars	7,245	12,249	56,280	106,465
Alloy steel bars	475	931	4,775	11,400
Iron bars	112	171	881	3,754
Plates, iron and steel	6,276	17,640	61,636	107,296
Sheets, galvanized steel	7,068	11,374	52,427	83,896
Sheets, galv. iron (a)	549	3,590	83,896	
Sheets, black steel	6,862	16,948	67,724	95,326
Sheets, black iron	843	1,373	5,967	7,545
Hoops, bands, strip steel	3,249	6,275	26,459	42,858
Tin plate; terne plate	15,577	18,041	127,391	136,121
Structural shapes, plain material	10,229	31,268	79,166	145,866
Structural material, fabricated	8,573	7,363	57,196	54,671
Tanks, steel (a)	855	...	7,863	...
Steel rails	7,750	5,215	54,633	82,392
Rail fastenings, switches, frogs, etc.	2,031	3,223	10,723	17,046
Boiler tubes	936	1,285	9,336	9,562
Casing and oil-line pipe	3,314	8,509	41,766	72,834
Pipe, black and galvanized, welded steel (a)	7,350	12,572	47,465	68,784
Pipe, black and galvanized, welded iron (a)	1,036	9,693	9,693	
Plain wire	1,877	3,789	15,583	26,127
Barbed wire and woven wire fencing	4,790	6,395	22,632	35,688
Wire cloth and screening	144	150	865	902
Wire rope	450	738	2,720	3,921
Wire nails	625	952	3,816	7,672
Other nails and tacks	484	928	3,403	5,635
Horseshoes	8	45	69	183
Bolts, nuts, rivets and washers, except track	783	1,206	6,025	8,127
Rolled and finished steel	99,491	168,639	780,084	1,134,072
Cast iron pipe and fittings	3,025	3,417	18,900	16,926
Malleable iron screwed fittings	680	1,143	6,428	6,356
Car wheels and axles	1,653	1,448	8,908	12,467
Iron castings	753	815	4,293	7,079
Steel castings	769	1,239	5,971	6,299
Forgings	678	663	4,987	7,213
Castings and forgings	7,558	8,726	49,487	56,339
All other	979	1,603	7,289	9,413
Total	159,392	247,815	1,225,001	1,591,803

(a) Not separately reported prior to 1930.

Imports of Iron and Steel Products into the United States

	(In Gross Tons)	
	June 1 to 17, 1930	Total
Austria	45	57
Belgium	5,166	1,473
Czechoslovakia	13	Europe
France	4,404	22,132
Germany	7,450	Yugoslavia and Albania
Italy	102	Canada
Netherlands	145	British India
Norway	1,102	Hong Kong
Poland and Danzig	485	Japan
Sweden	1,690	1
		29,137

Imports of Iron and Steel into the United States

	(In Gross Tons)	
	June	Six Months Ended June
	(a) 1930	1929
Pig iron	5,242	11,396
Ferromanganese*	2,199	5,534
Ferrosilicon†	465	561
Ferrochrome‡	57	20
Scrap	1,607	6,658
Pig iron, ferroalloys and scrap	9,570	24,169
Steel ingots, blooms, billets and slabs	809	1,671
Wire rods	774	1,336
Semi-finished steel	1,583	3,007
Rails and splice bars	103	1,332
Structural shapes	7,791	12,340
Boiler and other plates	407	72
Sheets and saw plates	2,763	2,266
Steel bars	987	3,170
Bar iron	42	672
Hoops, bands and cotton ties	666	3,245
Tubular products (wrot.)	1,916	4,032
Nails, tacks, staples	453	1,283
Tin plate	28	27
Bolts, nuts, rivets and washers	21	32
Round iron and steel wire	322	295
Barbed wire	272	612
Flat wire; strip steel	75	162
Steel telegraph and telephone wire	1	19
Wire rope and strand	208	256
Other wire	25	85
Rolled and finished steel	16,080	29,881
Cast iron pipe	1,804	6,679
Castings and forgings	100	169
Total	29,137	63,905
Manganese ore*	15,922	51,290
Iron ore	174,564	243,913
Magnesite	45	3,511
		21,407
		12,111

(a) Imports only through June 17, when Fordney-McCumber tariff act expired.

*Manganese content only.

†Silicon content only.

‡Chromium content only.

pired. The June figures therefore do not show the movement under the new Hawley-Smoot law. Imports to June 17 were 29,137 tons. This represents an average daily movement of 1714 tons, compared with over 2000 tons daily in May.

Imports for the last 13 days in June, under the Hawley-Smoot act, will be reported separately a little later.

Our iron and steel import table will be changed considerably beginning with July, reflecting chiefly the additional classifications under the new tariff law. The table will carry some items not heretofore included at all in the import shipments, though the

tonnage involved will be relatively small. The chief changes will be in classifications, by which a number of items now included, but not specified separately, will be separated out from each other.

As examples, sponge iron, now included under pig iron, will be reported by itself; steel bars will be split into several more specific items. As duties on manganese ore now begin at 10 per cent content, in place of 30 per cent, all ore of between 10 and 30 per cent, heretofore reported under iron ore, will hereafter be classified as manganese ore. This will increase the one item at the expense of the other.

net profit of \$1,694,002, equivalent to \$1.28 a share on the 1,322,395 shares of common stock outstanding at the end of the period. In the first half of 1929 net profit of the company and all subsidiaries acquired during that year totaled \$1,392,366, equivalent to \$1.05 a share.

McKeesport Tin Plate Co., McKeesport, Pa., in the six months ended June 30, had net profit after all charges and taxes of \$1,513,850, equivalent to \$5.05 a share on the 300,000 no par shares outstanding. In the first half of 1929 net profits amounted to \$1,084,562, or \$3.61 a share. The Metal Package Corporation, in which the McKeesport Tin Plate Co. owns 76 1/2 per cent interest, contributed \$314,256 to the 1930 earnings, compared with \$190,388 in the corresponding 1929 period.

Sharon Steel Hoop Co., Sharon, Pa., had net profit of \$30,129 after all charges in the six months ended June 30, equivalent to 8c. a share on the 375,000 shares of no par common stock. This compares with profit of \$944,550 in the corresponding 1929 period, equivalent to \$2.46 a common share.

Follansbee Brothers Co., Pittsburgh, had net profit of \$4353 in the six months ended June 30, equivalent to 14c. a share earned on the 30,000 shares of 6 per cent preferred stock outstanding, and compared with \$999,660 or \$5.55 a share on the 180,000 shares of common stock in the corresponding 1929 period. Common dividend of 50c. a share on common stock was declared, placing the issue on a \$2 annual basis as compared to a recent \$3 basis.

Spang, Chalfant & Co., Inc., Pittsburgh, in the quarter ended June 30 had consolidated net profit of \$958,110, against \$940,833 in the corresponding quarter of last year.

Stockholders of the Terry Steam Turbine Co., Hartford, Conn., on Aug. 12 will be asked to recommend that the company's present 4000 shares, par \$100, common stock be increased to 50,000 no par value shares, and that the 4000 shares of authorized preferred stock, of which 2000 are outstanding, be increased to 5000 shares, par \$100, bearing 7 per cent interest and callable at \$110 a share, as at present. The increase in capitalization is to be distributed to the stockholders in the form of a 66 2/3 per cent stock dividend.

Pioneer on Three Shifts

The Pioneer furnaces of the Republic Steel Corporation at Thomas, Ala., are now running on 8-hr. shifts, each man working six shifts a week. The blast furnaces of the Tennessee Coal, Iron & Railroad Co. have been operating on 8-hr. shifts for several years.

Steel Corporation Earned \$3.01 a Share

Quarter 43c. Under First Quarter—Total Earnings of First Half 10 Per Cent Ahead of 1928

EARNINGS of the United States Steel Corporation for the second quarter of 1930 amounted to \$3.01 per share of common stock after providing for the preferred stock dividends. They compare with \$3.44 per share for the first quarter.

Total earnings of the first half were \$96,676,901, as against \$132,100,842 for the first half of 1929 and \$87,867,018 for the first half of 1928. Thus the earnings were 10 per cent better than two years ago, whereas production this year is 4 per cent under that for the first six months of 1928 and prices, as measured by THE IRON AGE composite price for finished steel, were fully 3 per cent under the average for the first six-month period two years ago.

The special income was described as quarterly apportionment of net interest on Federal tax refunds, as in the first quarter's report, likewise the amount covered was identical, as given in the accompanying table.

In behalf of the finance committee

of the Corporation, it was stated that the plants are operating at the moment at about 63 per cent of capacity and that an increase was expected during the rest of the quarter with improvement during the last quarter.

Other Financial Statements

Colorado Fuel & Iron Co. reports net profit for the second quarter of \$324,895, after ordinary taxes, interest, depreciation and other charges, but before Federal taxes and deduction for equipment dismantled. This compares with \$479,471 in the second quarter of 1929. For the first half of the year profits were \$1,619,053 before Federal taxes, compared with \$1,419,453 in the first half of 1929. Earnings per share for the first half of this year are \$3.99, compared with \$3.48 for the first six months of 1929, and \$1.69 in the same period of 1928. The company's second quarter profits, at 73c. a share, were 40c., less per share than the profits of the second quarter of 1929, but 30c. a share more than in the second quarter of 1928.

Warren Foundry Pipe Corporation reports net profit of \$128,276 for the first six months of 1930, equivalent to 64c. a share on the capital stock, which compares with 53c. a share in the first half of 1929.

Truscon Steel Co. had net earnings of \$601,280 in the second quarter, against \$130,905 for the first quarter. In the second quarter of 1929 the company showed a net profit of \$1,003,494.

Virginia Iron, Coal & Coke Co., Roanoke, Va., reports net loss of \$110,219 for the first six months of 1930.

Blaw-Knox Co., Pittsburgh, in the six months ended June 30, 1930, had

Earnings of United States Steel Corporation	
	Total Earnings
April, 1930.....	\$16,113,581
May, 1930.....	16,570,790
June, 1930.....	14,376,931
Total for quarter.....	\$47,061,304
Less, charges and allowances for depletion, depreciation and obsolescence.....	15,921,493
Net income	\$31,139,811
Deduct: Interest on bonds:	
Subsidiary companies	\$1,397,189
Corporation bonds	12,541
	1,409,730
Balance	\$29,730,081
Add, special income receipts	2,396,636
Total	\$32,126,717
Dividends:	
Preferred, 1 1/4%. \$6,304,919	
Common, 1 1/4%. 14,981,533	
	21,286,452
Surplus for the quarter..	\$10,840,265

PERSONALS

C. B. WOODWORTH, who has been manager of the western division of the Vanadium Corporation of America at Chicago, has been appointed manager of the railroad division of the corporation, with headquarters remaining in the Straus Building, Chicago. WALTER SMITH has been appointed assistant manager of the railroad division. Mr. Smith is a graduate in mechanical engineering, Cornell University, 1909. He entered railroad service with the Chicago, Rock Island & Pacific. In the war he was connected with the P. L. & M. shops and regimental camp at Nevers, France. After the Armistice, he was associated with the Inter-Allied Railroad Commission.

P. J. GIBBONS, formerly assistant secretary and treasurer of the Vanadium Corporation of America, 120 Broadway, New York, has been elected secretary and treasurer of the corporation, succeeding the late Nils Falk.

CLAUDE O. STREETER, for the past 18 years associated with Graton & Knight Co. and its subsidiaries as chief mechanical engineer, has resigned to accept a similar position with the Schwartz Belting Co., 76 Murray Street, New York.

FRANCIS A. EMMONS, vice-president of Foote Brothers Gear & Machine Co., recently returned from a business trip to the West Coast. He reports a general optimistic feeling for business outlook for latter part of 1930.

STANLEY G. DISQUE has been appointed district sales manager for the Indianapolis district of the Republic Steel Corporation and R. G. WORKING has been named as assistant district sales manager for the Cincinnati district. Subdistrict sales offices in the Chicago district have been established in Milwaukee in the First National Bank Building in charge of N. E. NELSON and in St. Paul in the Merchants Bank Building in charge of R. W. WENTWORTH and C. V. GARDNER.

DR. HUGH P. BAKER, manager of the Trade Association Department of the Chamber of Commerce of the United States, has tendered his resignation, effective Oct. 1, to accept the position of dean of the New York State College of Forestry, at Syracuse.

RALPH G. HESS has returned from a three-months' study of industrial building construction in England, Germany and the Netherlands for the H. K. Ferguson Co., Cleveland.

MARCUS A. GROSSMANN, chief assistant to F. J. Griffiths, president of the Republic Research Co., research subsidiary of the Republic Steel Corporation, has been given the degree of doctor of science by Harvard Uni-

Corporation, Pittsburgh. For the next 12 years he was identified with the United Engineering & Foundry Co., Pittsburgh, where he was largely concerned with the metallurgy and design of rolls. He then went with the Mackintosh-Hemphill Co., Pittsburgh, as manager of roll sales, having held that position until he joined the Duquesne company.



M. A. Grossmann

versity, following studies on the quality and behavior of special steels. In collaboration with E. C. Bain, Dr. Grossmann has written a book on high-speed steels, which is now on the press. With Mr. Griffiths, he sailed July 24 for several weeks in Europe.

FRANK J. HOENIGMANN, who has been general superintendent of the Moline, Ill., branch of the Minneapolis-Moline Power Implement Co., with which he had been associated 10 years, resigned Aug. 1, to become general sales manager for the Cribben & Sexton Co., Chicago. He will be succeeded by A. ANDERSON, assistant superintendent in the Moline branch for the past four years.

H. A. LOMAX, for the last 3½ years identified with roll sales and engineering work for the Duquesne Steel Foundry Co., Coraopolis, Pa., has been appointed general manager of the Wheeling Mold & Foundry plants of the recently organized Continental Roll & Steel Foundry Co. In this position he succeeds H. E. Field, who was also president of the Wheeling Mold & Foundry Co., and has now been made vice-president and treasurer of the Continental company, with headquarters at Chicago. Mr. Lomax attended Harvard University and entered the steel industry through the engineering and drafting department of the Jones & Laughlin Steel

W. R. K. SCOTT, metallurgist at Aliquippa works, Jones & Laughlin Steel Corporation, has been moved to the general office as sales engineer on tubular products. J. H. FLAHERTY, metallurgist at Pittsburgh works, succeeded Mr. Scott as metallurgist at Aliquippa works. C. C. HENNING succeeds Mr. Flaherty as metallurgist at Pittsburgh works.

E. C. WILSON, formerly in charge of the pricing group of the gear and reducer division of Foote Brothers Gear & Machine Co., Chicago, has been appointed assistant sales manager. Until 1929 he was assistant sales manager of the R. D. Nuttall Co., Pittsburgh.

J. M. LESSELLS, DR. J. P. DENHARTOG, DR. S. TIMOSHENKO and R. E. PETERSON, all of the Westinghouse Research Laboratories, Pittsburgh, will attend the third International Congress for Applied Mechanics to be held in Stockholm, Sweden, the week of Aug. 25. Mr. Lessells has been named as one of the three engineers officially to represent the United States at the Congress. He is in charge of the mechanics division of the Westinghouse laboratories. After the congress, Dr. Den-Hartog will spend a year at Göttingen, Germany, studying under Dr. L. Prandtl. Dr. Timoshenko, Dr. Den-Hartog, and Mr. Peterson will present papers of their own before the congress, and, with Mr. Lessells, will present papers by other Westinghouse engineers.

H. B. KINNEAR, for five years metallurgist for the Marion Steam Shovel Co., Marion, Ohio, and the patentee of the high-tensile copper steel used in that company's castings, has severed his connections with that company and expects to enter the consulting field.

HENRY D. SHARPE, president, Brown & Sharpe Mfg. Co., Providence, FREDERICK J. HAYNES, president, Durant Motors, Inc., Detroit, and A. J. BROSSEAU, president, Mack Trucks, Inc., New York, have been appointed

members of the committee on National Defense of the Chamber of Commerce of the United States, which will cooperate with the Army Ordnance Association in a demonstration of ordnance equipment at Aberdeen, Md., Oct. 9.

WALTER S. STAPLER has been put in charge of a district sales office which the General Refractories Co. has established in the Empire Building, Birmingham.

Makers of Welded Wire Fabric Form Institute

Manufacturers of welded wire fabric reinforcement announce the establishment of the Wire Reinforcement Institute, with headquarters in the National Press Building, Washington. The purpose of the institute is to provide a centralized organization to exploit the technical and utilitarian merits of wire as used for concrete reinforcement. Sponsored and supported by the several companies engaged in the manufacture of Welded Wire Fabric, yet independent of the commercial interests of any single manufacturer, the institute will function as a purely promotional organization, its activities including the assembly and dissemination of authentic information, data and statistics relevant to welded wire fabric and its uses.

The activities of the institute will be conducted under the direction of Royall D. Bradbury, formerly instructor in structural design at the Massachusetts Institute of Technology, later, vice-president in charge of the welded fabric department of the Clinton Wire Cloth Co., and recently, contract manager of the Aberthaw Construction Co., Boston.

Change in Hours of National Metal Exposition

Changes in the hours of the forthcoming National Metal Exposition in Chicago have been announced by W. H. Eisenman, director of the exhibits. The major change is in the number of evenings during which the show will be open. For the first time exhibits will be open only two evenings instead of three, as in the past. Action on this matter was taken by representatives of the American Institute of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers, the American Welding Society and the American Society for Steel Treating at a meeting at Atlantic City in June.

The exposition will be open from 10 a. m. to 6 p. m. on Monday, Wednesday and Thursday, Sept. 22, 24 and 25. On Tuesday and Friday the exhibits may be viewed between noon and 10 p. m. This arrangement provides one more free evening than in previous years.

▲ ▲ ▲ OBITUARY ▲ ▲ ▲

MONTFORD E. DANFORD, assistant vice-president of the American Rolling Mill Co., Middletown, Ohio, died July 25 in Chester, England, following a heart attack. He left Middletown in March at the head of a group of engineers and others to take charge of Armco operations and installation of plant equipment at John Summers & Sons, Ltd., in Chester. Mr. Danford was 52 years old. He joined the company in 1910 as open-hearth superintendent at Middletown. Later he became assistant general superintendent, plant superintendent and works manager. Last October he was named assistant vice-president. He was born in Lilly Chapel, near Columbus, Ohio. He was graduated from Ohio Wesleyan University and was a school teacher in Canfield, Ohio, before entering on his industrial career.

CHANCE M. VOUGHT, a pioneer of aviation and president of the Chance Vought Aircraft Corporation, East Hartford, Mass., died Friday, July 25 at the Southampton, L. I., hospital following a long illness. He was 42 years old, a native of New York, a graduate of New York University and spent his entire business career in the aircraft industry.

SCOTT H. BLEWETT, 79 years old, general agent for the American Car & Foundry Co., St. Louis, for the last 35 years, died of heart disease at his home there on July 24 after an illness of several years. He was born in Georgetown, Ky., was educated at Colby University, Waterville, Me., and went to St. Louis in 1874. Earlier

in his career he served as principal of several St. Louis public schools.

WALTER S. BICKLEY, formerly president of the Penn Steel Casting Co., Chester, Pa., died July 25, at his home in Swarthmore, aged 63 years. He had been retired for the past 15 years, but retained an interest in the company.

DONALD MACARTHUR, vice-president and director in the Koppers Gas & Coke Co., Pittsburgh, the Eastern Gas & Fuel Associates, Boston, and the Seaboard By-Product Coke Co., Kearny, N. J., died July 24 at the Mountainside Hospital, Montclair, N. J., following an abdominal operation. He was born in August, 1880, in Glasgow, Scotland. He came with his parents to Superior, Wis., when he was seven years old. He was graduated from the University of Wisconsin in 1904 with the degree in mechanical engineering.

BYRON O. BRILL, general purchasing agent, J. G. Brill Co., whose death July 21 at the age of 51 years was reported in this column last week, was a graduate of the Spring Garden Institute of Philadelphia. His father, George Brill, was one of four sons of J. G. Brill, the founder of the company bearing his name. Byron Brill joined the Brill company in 1898 and was continuously with it except for 6 years, from 1900 to 1906, when he was with the General Electric Co., at Schenectady. He was a charter member of the Purchasing Agents Association of Philadelphia.

Program of National Metal Congress

Technical programs of the twelfth annual National Metal Congress to be held in Chicago the week of Sept. 22, are assuming final form. Meeting with the American Society for Steel Treating at the 1930 congress will be the Institute of Metals and the Iron and Steel Division of the American Institute of Mining and Metallurgical Engineers, the Machine Shop Practice and the Iron and Steel Divisions of the American Society of Mechanical Engineers, and the American Welding Society.

Many Technical Sessions

The steel treaters will have sessions on sales problems, corrosion-resisting metals, nitriding, forgings, steel melting and carburizing. Two other sessions will be devoted to miscellaneous topics and a third to papers dealing with theoretical metallurgy. The Campbell memorial lecture, to be delivered by M. A. Grossmann, vice-president of the Republic

Research Corporation, will be on "Oxygen in Steel."

The American Institute of Mining and Metallurgical Engineers will sponsor two sessions on the beneficiation of iron ore, led by C. B. Murray, consulting chemist, Cleveland.

A session on combustion problems and furnace design is a high light of the program of the American Society of Mechanical Engineers. The molding of phenol materials will be discussed in detail at another session. Polishing and nitriding are also on the program. The welding society has scheduled a session on the welding of structural steel. Reports of recent researches into welding procedure will be presented at the other meetings.

A. O. Smith Corporation, Milwaukee, has purchased a Bellanca six-place cabin monoplane for the transportation of executives.

Natural Gas Line Projects Still Active

Large Mileages Have Been Placed this Year, with Possibly More of Considerable Size to Come

WITH the steel pipe trade enjoying a degree of activity not enjoyed by any other branch of steel manufacture, the prospects for the placing of considerably more business this year are said to be fairly good. With about 2000 miles of natural gas, gasoline and oil lines still under contemplation, fully 1000 miles may be awarded this year.

A gasoline line, for which 75,000 tons of pipe was ordered within the past week, will be built by the Continental Oil Co. and the Barnsdall Corporation from Oklahoma to points in the Central West.

Projects pending include a 220-mile gas line for interests identified with the Sun Oil Co., to run from West Virginia and Kentucky to northern Ohio cities; several hundred miles of 20-in. pipe for a line to be extended from West Virginia and Ohio to Washington, Baltimore, Atlantic City and Philadelphia by the Columbia Gas & Electric Corporation; 200 miles of 10½-in. and 12½-in. pipe for a line in Tennessee and Kentucky for the Appalachian Gas Co., while Clarence S. Dame, Inc., has asked for bids on 276 miles of 4½-in. to 8½-in. pipe for a gas line.

Among the important pipe line projects which have been awarded so far this year are the following:

Missouri-Kansas Pipe Line Co., 1200 miles, from the Panhandle of Texas to Indianapolis and Terre Haute, Ind., via Kansas City, Mo.; pipe awarded to National Supply Co.

Union Gulf Corporation, 1200 miles, from Oklahoma to Pittsburgh; pipe awarded to National Tube Co.

Continental Construction Co. (representing a group of oil companies, includ-

ing Cities Service, Standard Oil of New Jersey and others), 900 miles, from Southwest to Chicago; 480 miles awarded to National Tube Co. and 450 miles to A. O. Smith Corporation.

Southern Natural Gas Corporation, 800 miles, extension of lines built last year, new lines running to Mobile and Montgomery, Ala., Bogalusa, La., and Macon, Ga.; pipe awarded to A. O. Smith Corporation, the National Tube Co. and Republic Steel Corporation.

Missouri Valley Gas Co., 800 miles, from Panhandle of Texas to Lincoln, Neb.; pipe awarded mostly to A. O. Smith Corporation.

Montana-Dakota Power Co. and Hope Engineering Co., 350 miles, to North and South Dakota; pipe awarded to A. O. Smith Corporation and National Tube Co.

Ajax Pipe Line Co., representing Standard Oil Co. of New Jersey and Ohio Oil Co., 800 miles; pipe orders divided among four mills, Bethlehem Steel Corporation, Republic Steel Corporation, Jones & Laughlin Steel Corporation and Youngstown Sheet & Tube Co.

Great Lakes Pipe Line Co., controlled by Continental Oil Co. and Barnsdall Corporation, 1400 miles, gasoline-carrying line into Iowa and Wisconsin; pipe awarded to National Tube Co.

Southwestern Natural Gas Co., 150 miles, from Quinton, Okla., to Tulsa and Sand Springs, Okla.; pipe awarded mostly to A. O. Smith Corporation.

Phillips Petroleum Co., 800 miles, gasoline-carrying line from Oklahoma to Kansas and Illinois; pipe awarded to Republic Steel Corporation.

Susquehanna Pipe Line Co., subsidiary of Sun Oil Co., 700 miles, gasoline-carrying line from Marcus Hook, Pa., to Cleveland and Toledo; pipe awarded to National Tube Co. and Jones & Laughlin Steel Corporation.

Southern California Gas Co., 80 miles, lines in California, to A. O. Smith Corporation.

graph of the section reads as follows:

Unfair methods of competition and unfair acts in the importation of articles into the United States, or in the sale by the owner, importer, consignee, or agent of either, the effect or tendency of which is to destroy or substantially injure an industry, efficiently and economically operated, in the United States, or to prevent the establishment of such an industry, or to restrain or monopolize the trade and commerce in the United States, are hereby declared unlawful, and when found by the President to exist shall be dealt with, in addition to any other provisions of law, as hereinafter provided by law.

The section calls for investigation and hearing by the Tariff Commission, but permits of rehearing by the commission and appeal to the Customs Court. An embargo is provided for through Presidential proclamation.

Mr. Adkerson last week wrote Chairman Hamilton Fish, Jr., of the Congressional committee which is investigating the Russian situation, charging that Russian manganese is being dumped at such low prices that the domestic industry is being wrecked. Denial of the charge has been made by the Amtorg Trading Corporation, Russian importing concern. It was stated through the Amtorg that Russian ore is not being sold below cost and that, as the Russian ore is much higher in quality than the American ore, there is no competition. Denial also was made that the ore is produced by convict labor.

Mr. Lowman has announced that all imports from Russia will be embargoed if they are produced by convict labor. He said that an investigation already has been begun by the Treasury Department as to the production of manganese, lumber and anthracite coal in Russia.

Russian Shipments Attacked

Efforts to embargo Russian shipments are being made by several sources, including Senator Reed, of Pennsylvania, the American Wage Earners' Conference, affiliated with the American Federation of Labor, and the National Lumber Manufacturers' Association. In his letter to Secretary Mellon urging exclusion of Russian lumber and anthracite coal on the ground that these products are produced by convict labor or are being dumped into the United States, Senator Reed expressed confidence that there is ample evidence to justify such action. He also quoted Chairman Brossard as saying there was some question whether the Russian coal situation might not be considered under the unfair competition provisions. It is under these provisions that Mr. Adkerson filed his complaint about manganese imports with the Tariff Commission.

Imports of manganese ore from Russia during the present year up to June 17, totaled 70,148 tons, or 47 per cent of the total of all manganese imports for that period, amounting to 163,117 tons. Of the Russian imports during the current year, 47,252 tons was entered at Baltimore; 20,024 tons at Pittsburgh; 3544 tons at Mobile, Ala.; 3500 tons at New York, and 2872 tons at Philadelphia.

Urge Embargo on Russian Manganese

American Producers Charge "Dumping"—Treasury Department Also Investigating Lumber and Coal

WASHINGTON, July 29.—Formal complaints were filed today with Assistant Secretary of the Treasury Lowman and Chairman Brossard of the Tariff Commission, by J. Carson Adkerson, president, American Manganese Producers' Association, seeking an embargo against imports of manganese ore from Russia. One complaint is filed under section 337 of the Hawley-Smoot tariff act, charging that the Russian ore is being dumped into the United States and has injured the domestic manganese industry. The other was filed under section 307, charging that the ore is produced by convict labor. Under either section the charges, if substantiated, would mean embargoing manganese ore shipments from Russia.

The action taken by the American Manganese Producers' Association is

part of a general drive to embargo imports of all kinds from Russia on the ground that they are either being dumped into the United States or are produced by convict labor, or both. The campaign is directed especially against imports of manganese ore, anthracite coal and lumber. It gained momentum following the ruling last Friday of Assistant Secretary Lowman, in charge of customs, placing an embargo on imports of pulp wood from Russia, which the Treasury held is produced by convict labor.

In an informal statement, Mr. Adkerson claimed that Russian ore is being sold in the United States at a delivered price of \$26 a ton as against the American ore delivered price of \$35.

Section 337 deals with unfair practices in import trade. The first para-

W. W. MACON
Editor

THE IRON AGE

A. I. FINDLEY
Editor Emeritus

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The Haze of Russian Business

WITH the Amtorg Trading Corporation occupying the news spotlight in the past week because of an investigation by a committee of the House of Representatives into its alleged communistic activities in this country, discussion flared up anew in machinery and equipment trade circles over the credit situation involved in the sale of goods to that organization.

Since the Amtorg Trading Corporation began business operations in the United States its demand for long-term credits has been one of the most perplexing problems that American manufacturers, desirous of selling to Russia, have been called upon to face.

Several of the largest companies in the United States have granted unusually long credits. One company is said to have sold \$25,000,000 worth of equipment on payments extending over five years. Others have granted terms ranging from one to three years. Quite a number of manufacturers have demanded cash with the order or bill of lading, and in some instances have got it, especially when their product is special and not duplicated in other countries.

Manufacturers of machine tools and allied equipment have generally been offered 25 per cent with the order, and the balance in payments over six or twelve months. Some have been willing to accept such terms, but others have not done so, and have cited as a reason for refusal the fact that it would not be fair to domestic buyers or foreign buyers in other countries to give terms which are not accorded in domestic trade or in foreign business.

Recently the Amtorg Trading Corporation solicited advertising from American manufacturers for a publication of its own that is circulated in Russia, and the fact that the letters which went out bore the statement "terms 30 days net" created considerable comment among companies which have been selling Amtorg on long-term credits.

The trade balance with Soviet Russia is largely in our favor. In the first four months of this year, for which Department of Commerce figures are available, our total exports to Soviet Russia in Europe were valued at \$54,885,733, against \$6,987,596 in imports. For all of 1929, the exports were \$81,547,760 and imports were \$21,519,984 while in 1928 exports were \$72,503,956 against \$13,949,009 worth of imports.

A veiled threat of a boycott of American goods was conveyed in a statement read into the record by Peter A. Bogdanov, chairman of Amtorg, at the Congressional hearing concerning communistic propaganda. Another such threat comes from Maxim M. Litvinof, the new foreign commissar of the Soviet,

who is quoted in a cable dispatch to the *New York Times* from Moscow as saying that:

"Attempts are being made by shortsighted—in their own interest—enemies of the Soviet regime to restrict or prevent the sale of our goods or raw materials in their respective countries. They must know that in the present conditions we cannot buy from them unless we sell. If they will not buy our goods, we shall transfer our purchases elsewhere."

Opinion in quarters that have done business with Amtorg is that the continuance of the Soviet's large purchases in this country depends primarily on the willingness of our manufacturers to give long-term credits. About \$1,000,000 worth of machine tool purchases, now pending, may go principally to Germany, according to reports here, because more manufacturers are demanding cash than was true before the Amtorg investigation was begun. A good many who have refused credit, have, however, been consistently pessimistic as to the ultimate success of the Soviet five-year program.

The picture of Russian-American business relations still remains wrapped in a haze.

Pre-War Prices Purely History

LATELY, after an interval of some years, talk has returned of pre-war price levels. Such talk has an unfortunate and improper influence upon general thinking. Prices indicated by the term "pre-war" are simply one part of a long history. There was a great deal of history before that pre-war period, and, more important now, there has been a great deal since.

In the confused months following the Armistice there was talk of readjustments to the "pre-war basis," but Prof. Irving Fisher insisted that to talk of pre-war prices was to talk in a dead language. There may have been question at the time whether it was certain he would be found right. But with all that has since occurred "pre-war prices," as such, are completely dead and most people have thought they were buried.

Such reference would mean that we were headed for pre-war conditions, but those conditions cannot come back, because everything has changed. If there were chances of a reversion to 1913 there would also be chances of reversion to other times. It is 17 years back to 1913. We might go back eight years more, when prices were 15 per cent lower than in 1913, or go back a total of 34 years when prices were 34 per cent lower than in 1913. Or if we went back half a century we should find prices much higher than in 1913.

It is curious that so few men seem to realize that, other things being equal, the natural trend of prices is

downward. One who does not recognize that must deny that we are making progress in efficiency. When we produce things by better methods and with less effort, and prices do not go down, it is because something balances. And one cannot expect these things always to balance.

If, instead of referring to prices, one should say that perhaps we shall have to get around to working as hard as before the war, there would be something definite to debate. If we wanted only the same things we had then, we certainly should not need to work so hard; while if we want many more things than contented us then, perhaps we should need to work even harder than then.

Advances in the various commodities were not uniform and declines would have to be un-uniform to put things back to 1913. If merely the average were restored, with some things higher and some lower, it would merely be a change, of no significance whatever, and particularly so because our relative consumption of different commodities has changed greatly. Per capita consumption of some foods has decreased. Per capita consumption of electric current in the home has greatly increased, and so on with nearly everything.

It may, however, be of interest to mention how 1913 prices stand relative to present prices. By the composite of *THE IRON AGE*, finished steel prices were 23.4 per cent lower in that year than now. For all commodities the Bureau of Labor index number would have to go down somewhat more than 25 per cent. If anybody can restore 1913 conditions as to freight rates, labor and other matters, the steel industry could reduce its prices by more than 23.4 per cent and make more money than it has been making.

Pre-war prices and pre-war conditions are purely a piece of history, and no longer an important piece.

The Natural Gas Surprise

NEARLY two years ago it became common talk in the steel trade that the pipe mills had not realized the sales possibilities of line pipe in connection with natural gas transportation. There is a full realization now, with seamless tubing being made up to 24 in. and two installations by pipe companies to make electrically welded in even larger diameters, all in addition to the electrically welded which has been making Milwaukee famous again in the last three years.

This development of long-distance transportation of natural gas was a surprise. We quote from the natural gas chapter in *Mineral Resources, 1921*, by the United States Geological Survey, when a decline in natural gas production from 1920 to 1921 was noted:

A single year's decline does not warrant the assumption that the industry has already passed its peak of production in both quantity and value, but the data at hand in regard to the gas still available underground and its relation to municipal centers or industrial markets make it probable that the annual output will never be very much more than it was during the period 1916-1920.

Piping natural gas hundreds of miles upset that prediction. Last year's gas production was two and one-third times the maximum production on record at the time the prediction was published, only seven years ago. There were big lines laid last year which car-

ried little of the year's gas production and bigger lines are being laid this year. From the annual report just issued by the Bureau of Mines, showing relative heat values in production of fuels, with estimates of what is represented by water-power produced, it appears that natural gas production in 1929 is estimated at about 1860 billion cubic feet, making the following comparison:

NATURAL GAS PRODUCTION

	Billions of Cubic Feet
1915	629
1920	798
1925	1,189
1926	1,313
1927	1,445
1928	1,568
1929	1,860

Production has been increasing in more than geometric ratio. From 1915 to 1920 the average annual increase was 4.87 per cent. Despite the fact that 1920 was a record year and there were some setbacks thereafter, the average annual increase 1920 to 1925 was 8.30 per cent, and from 1925 to 1929 the average was 11.84 per cent, with 1929 showing the largest gain of the four years. It is astonishing that the percentage rates of increase should go up thus.

A thousand miles of 24-in. pipe runs into money, over \$10,000,000, and the complete line, with its rights of way, laying, pumping stations, gathering and distributing lines, etc., will cost several times that amount, but at ten cents a cubic foot at the well it will transport about \$5,000,000 value of gas in a year. This enables the engineers to compute that a line can be amortized in 15 years and supply a profit.

It would require about a dozen pipe lines 20 to 24 in. in diameter to carry the increase in gas production from 1927 to 1929. Only an approximation can be made as each line has an individuality. It is readily seen that, as the fresh lines have to be longer and longer, to reach markets, gas supplies would not have to increase as rapidly as in the past to make much line pipe tonnage for the steel industry.

Manganese Ore "Dumping"

MANGANESE ore has again appeared on the front pages of the American press. Last week prominence was given to protests of the American Manganese Producers Association against the "dumping" of Russian manganese ore on the American market. The following statement is typical:

What the Soviet dumping of manganese in this country has done is to strangle an infant industry. American production of manganese was begun only during the war, as a war measure, and since then, until the development of the Soviet competition, American mines have been producing 200,000 tons of the 800,000 tons of manganese used in this country annually.

Irrespective of the merits of the accusations against the Soviet Government, let the figures speak: In the last four years—1926 to 1929—198,100 gross tons of high-grade manganese ore, of which 133,000 tons was metallurgical ore (manganese, 35 per cent minimum), was taken from domestic mines. Imports for the four years have been 2,452,000 tons. Thus the contribution of American mines to a four-years' consumption of 2,585,000 tons has been only about 5

per cent—not 25 per cent, as suggested in the quotation.

The main contention might well have been that as the infant has not grown beyond the 5 per cent size strangulation would be altogether too easy.

HERE are some bright spots in the business picture. June figures of sales of mechanical stokers were the highest since last October; and every month since January, save only May, has shown a substantial increase. Steel barrel manufacturers, during the first six months of 1930, produced and shipped more barrels than in any previous half-year. Steel boiler orders in June were the largest since last October.

What Price Bonus?

(Concluded from page 278)

The necessity for offering large monetary inducements to management is stressed by all students of incentive plans, although examples abound of men engaged in scientific, intellectual, journalistic, artistic or religious work who are paid small salaries but find satisfaction in their achievements. The enthusiasm of many in such vocations is known to be unflagging, and their contributions to society are frequently beyond measurement in money; yet for the conduct of the ordinary business enterprise a more tangible incentive is regarded as necessary. On this point, "Profit Sharing" by Gorton James, Henry S. Dennison, Edwin F. Gay, Henry P. Kendall and Arthur Burrill says:

"Experience shows that the enjoyment of work well done carries only a limited incentive which palls from repetition, but which may be reinforced advantageously by a financial reward, provided that reward can be offered genuinely as such and not as a gratuity."

Commercial Production of Welded Steel Machinery Parts

(Concluded from page 291)

Welded steel construction cannot be applied to replace all castings used in machinery construction. The exceptions are in the field of small castings or in castings made of metal which cannot be welded satisfactorily. In the heavier machinery parts, where the section is susceptible to some degree of simplification, the cost of welded steel construction is, in many cases, less than the cost of using gray iron castings. In certain classes of machinery where certainty of operation is an important factor, or where a high degree of fatigue resistance is necessary, welded steel construction may economically replace annealed steel castings. However, no general statement can be made which is applicable to all machinery parts.

Guidance in Redesign of Castings

In many cases the commercial production plant is called upon to assist the machinery manufacturer in the redesign of his equipment for welded steel construction. We have found it necessary to establish a development and research division, the facilities of which may be utilized by the machinery builder at a nominal charge. It has been found that the design can be reduced to an economic basis much more rapidly in this way than if the redesign job is done by a

designer who has not had experience with this type of construction.

Owing to the fact that the patent office has shown a disposition to grant patents on welded steel assemblies, we make special provisions to protect the manufacturer's rights to his own inventions.

Gearing the Commercial Production Plant to Industry

It has perhaps been evident in the preceding discussion that many problems have had to be met and solved in order to gear the commercial production plant to industry in such a way as to meet the machinery manufacturer's requirements. We do not feel that all of the problems have been solved, but from our experience up to the present time, we have a clear indication of the fact that we are well along the way toward a satisfactory solution to the principal problems involved.

Cutting Keyways on Rolling Mill Table Rollers

(Concluded from page 283)

about these operations but the next does present something different.

The keyseating of the long hub of these rollers presented a troublesome problem and it was finally decided to try keyseating them with the cross-sliding turret of the Libby while set up for the turning operation. The method has proved successful and the illustration herewith shows quite clearly, the machine, the setup and the keyway about half completed. The keyseat is $1\frac{1}{2}$ in. wide and $\frac{3}{4}$ in. deep and is completed in two operations. The first operation is to cut out half the width with the tool shown on top of the turret, to the proper depth. The second operation is done with a full width tool and is shown about half completed in the photograph. This method saves a setup for keyseating and insures that the keyway will be parallel with the bore of the roller. It has proved very economical.

Slag Control Essential

(Concluded from page 289)

in the analysis of the charge and fluxes are liable to affect this coloration.

The practical application of such results is of greater concern to the tonnage mill than to the shop making high-quality steel on account of its inferior raw materials. However, it is surprising how little this relationship between slag and metal is relied upon by the steel mills, despite the fact that hundreds of tonnage hours are lost monthly on account of unnecessary delays for laboratory reports. This indifference is probably due to the fact that the stationary furnace operator has few opportunities to adjust the composition of the slag. To get rid of poor slag is out of the question. To add basicity to any extent under such circumstances might retard the heat too much.

We return to the fundamental principle in basic-open hearth production of tonnage steel proved by studies on slag in recent years: The bigger the bath area the greater is the necessity of having the final slag as pure as possible. This can be obtained only by a more or less complete change of slags. This is also in accordance with the present trend of

The Week in Business

Drift of Current Financial and Economic Opinion

A FIRMER foundation on which to base recovery is seen by National Industrial Conference Board. Inventories and stocks of finished goods in many lines are regarded as low, in comparison with current demand. "Price reductions have increased consumer purchasing power, and the volume of goods moving in retail channels compares favorably with that of earlier years."

New Emphasis on Retail Prices

Retail prices have been attracting a lot of recent attention. Thus, from *Commerce and Finance*: "As retail prices register the decline which the collapse of wholesale prices has led buyers to expect, confidence will be reestablished and distribution quickened."

"People are expecting lower prices," says the head of a large wholesale house serving thousands of independent retailers, in announcing general price reductions to his customers. "They are not willing to pay last spring's prices. The public in many localities is on strike. Conditions will not materially improve until the lower prices, at retail, are generally obtainable."

Recently announced reductions in retail prices are discussed by Harvard Economic Service with relation to wholesale prices. Precise comparisons cannot be made. Locality often governs retail price changes. "Retail prices fluctuate less widely than wholesale, and almost always move later. . . . General wholesale prices may be expected, as usual, to lead in recovery."

July Regarded as Seasonally Dull

Data at hand make that organ-

ization believe that, though manufacturing activity in July has declined, it has dropped by only a moderate amount, despite factory "vacations." July is classed as "normally . . . the low point of the year."

That no "adventitious methods of any kind can avail in reviving trade" is the verdict of *Commercial and Financial Chronicle*. "It is going to be uphill work under any circumstances, and what is required above everything else—what alone can start the wheels of industry and progress—is getting back to first principles. . . .

"If for some time to come, as seems likely and indeed inevitable, the country shall be obliged to get along with a diminished volume of trade and business, the best policy is to adjust ourselves as speedily as possible to the new order."

Looks for Improvement Next Month

With production well below potential consumption, however, Alexander Hamilton Institute looks to August "to provide at least some evidence that business has definitely commenced to work upward." The institute views the slump in commodity prices and curtailment of production as "decidedly favorable factors, so far as the future is concerned."

At the same time it sees business now in "the most acute stage of the depression phase of the business cycle," with July reports promising "to reflect even more unfavorable conditions than those prevailing in June." And other commentators regard the present situation as being "the trough of

the current business depression."

Continuance of cheap money is regarded by *Commerce and Finance* as a menace which "sooner or later must be manifest in a revival of speculation. This is as regrettable as it is inevitable," says Mr. Price of that journal.

How Improvement May Come

Slow and irregular improvement is visioned for the near future by Guaranty Trust Co. of New York. "Expansion of industrial output and trade volumes will proceed gradually, with setbacks from time to time as it appears that demand in various lines has been overestimated. In general, however, the rising trend of business will result in more employment and larger payrolls, with greater aggregate purchasing power available. . . .

"That the American public will have the capacity to buy, as the season progresses," says Union Trust Co., Cleveland, "is indicated by the fact that savings deposits . . . have shown a definite increase during the first half of this year." This observer feels that "surplus stocks have now been thoroughly worked off" and that merchandise bought last fall must now be pretty well used up and in need of replacement.

That business sentiment has perceptibly freshened is the belief of *Business Week*, although its index of activity has taken a further drop. The indexes of production and construction have been for four weeks above those representing general trade—a reversal of the situation prevailing through practically all of the first six months.

having the steel purified as much as possible while in the furnace, rather than to depend upon deoxidizing agents in the ladle and molds.

Future mass production of quality steel must therefore be undertaken in furnace units where the chemical and physical fluctuations of slag and metal can be immediately answered by additions or deductions to obtain their proper equilibrium.

From an entirely different viewpoint present facilities concerning the tonnage mill also seem rather inadequate. I refer to the problem of charging scrap. The system of handling scrap from the yard via charging machine into the furnace was invented and proved satisfactory before the automotive industry had started to flood the market with light,

bulky material. The enormous change that has taken place in America in the last few years in this respect can be realized from the statement that about 18 per cent of all steel produced in 1928 and 1929 went into the automotive industry. At the same time the average period of circulation of steel (45 to 50 years) has been cut by this industry to about 5 or 6 years. The actual charging operation also requires three times as long as for heavy melting steel.

In other words this great loss in charging time can not be counterbalanced by the cheapness of the scrap. Either the present methods of charging must be radically changed, or the limit of the industry to absorb this light material will soon be reached.

Iron and Steel Markets

Rail Buying in Prospect

Van Sweringen Lines Place 59,000 Tons and Other Orders
Are Looked For—Steel Output Unchanged and
Demand Throws Little Light on Future

RAIL business stands out as the only new element in the iron and steel market situation. The Van Sweringen lines have contracted for 58,600 tons of rails, and there are indications that other railroads will place their annual requirements earlier than usual. The New York Central is expected to inquire for 200,000 tons, the Pennsylvania for 180,000 tons and the Reading for 35,000 tons. The only immediate effect of hastening rail buying would be to improve business sentiment, since the railroads are behind in their specifications against present contracts. However, slight improvement in rail releases is reported from the South and from Chicago. The Ensley mill has resumed operations at a 50 per cent rate on specifications from four Southern lines.

Outside of prospective support from the carriers there is nothing in the current state of iron and steel demand that offers any definite clew as to the future. The trade still voices its belief that improvement is near, but, with concrete evidence of increasing activity lacking, makes no prophecy as to the extent of recovery. The extension of "vacations" among consuming plants and the announcement of fresh suspensions by companies that have operated through this month indicate that the stimulus from industrial resumptions may not be felt until the middle or end of August.

Tendencies in steel plant operations are irregular, with losses offsetting gains. Ingot output for the country at large remains unchanged at 56 per cent for the fourth week.

Activity is at its lowest ebb among manufacturers of goods for the ultimate consumer. Following the decision of the Ford Motor Co. to postpone resumption of operations from July 28 to Aug. 4 telegrams were sent to the steel trade rescinding releases of shipping orders. It is possible that the Ford shutdown may be extended into a fourth week, because of large stocks of cars in dealers' hands. Other motor car builders have suspended operations and it now seems unlikely that August output will show much of a gain over July production, estimated at 220,000 cars for this country.

The low prices of agricultural products and the extreme hot weather have further reduced farmer buying of sheets and wire products and have rendered the production plans of implement and tractor manufacturers more uncertain. An offsetting factor is a large foreign order for tractors booked by a Milwaukee plant. The protracted heat spell is also undoubtedly affecting canning crops, although the extent of damage suffered is not yet known. Tin plate output is still at a higher rate than production of most finished products, averaging 65 per cent.

Pipe lines, structural steel work and shipbuilding remain outstanding sustaining factors in an extraordinarily quiet period. Close to 10,000 miles of line pipe have been placed since Jan. 1, and manufacturers of diameters larger than 10 in. are committed until late in the year. Prospective gasoline lines promise to absorb much of the capacity in smaller sizes before many weeks have passed.

The Barnsdall Corporation and the Continental Oil Co. have awarded 1400 miles of 4 to 8 $\frac{1}{2}$ -in. seamless pipe, requiring 75,000 tons, for a gasoline line from Barnsdall, Okla., to Des Moines, Chicago and other Middle Western cities. Interests identified with the Sun Oil Co. are expected to take early action on a 220-mile natural gas line from West Virginia and Kentucky to northern Ohio points.

The total of structural steel projects added to the pending list, at 51,000 tons, is the largest since the last week in June. Lettings, at 31,000 tons, compare with 37,000 last week and 58,000 tons a fortnight ago. Weekly awards and inquiries since the first of the year average 33,000 tons each.

Shipbuilders will soon submit bids on six large mail contract steamers for W. R. Grace & Co., which will require a total of 30,000 tons of steel.

Prices have undergone further scattered reductions. Continuous mill sheets are down \$1 a ton to 1.75c., Pittsburgh, for No. 10 gage and 1.90c. for No. 13.

Utah and Indian pig iron for delivery on the Pacific Coast have been marked down \$2 to \$3 a ton, while Alabama iron for shipment to the St. Louis district is off 50c. to \$12, base Birmingham. A reduction of 50c. to \$17.50, furnace, on Chicago iron brought out one of the most active spurts of buying so far this year.

The stalemate in the scrap market persists and the very fact that prices show little movement is regarded as a good augury. The sharply reduced industrial output of old material has tended to counterbalance lower consumption.

The sharp recession in business in recent months has caused iron and steel producers to strive for further economies. The first half earnings of the United States Steel Corporation were 10 per cent above those of the first six months of 1928, though output was roughly 4 per cent smaller and prices, measured by THE IRON AGE composite for finished steel, were fully 3 per cent lower.

THE IRON AGE composite price for pig iron has declined from \$17.09 to \$16.96 a gross ton, dropping below \$17 for the first time since 1915. Finished steel is unchanged at 2.171c. a lb., its lowest since 1922.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous,
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	July 29, 1930				July 22, 1930				July 1, 1930				July 30, 1929				
	1930	1930	1930	1929	1930	1930	1930	1929	1930	1930	1930	1929	1930	1930	1930	1929	
No. 2 fdy., Philadelphia.....	\$19.76	\$19.76	\$19.76	\$21.26													
No. 2, Valley furnace.....	18.00	18.00	18.50	18.50													
No. 2 Southern, Cin'ti.....	16.69	16.69	16.69	17.69													
No. 2, Birmingham.....	14.00	14.00	14.00	14.50													
No. 2 foundry, Chicago*.....	17.50	18.00	18.00	20.00													
Basic, del'd eastern Pa.....	18.75	18.75	18.75	20.00													
Basic, Valley furnace.....	18.00	18.00	18.50	18.50													
Valley Bessemer, del'd P'gh.....	20.26	20.26	20.76	20.76													
Malleable, Chicago*.....	17.50	18.00	18.00	20.00													
Malleable, Valley.....	18.50	18.50	19.00	19.00													
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04													
Ferromanganese, furnace.....	94.00	94.00	94.00	105.00													

Rails, Billets, Etc., Per Gross Ton:

Rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh.....	31.00	31.00	31.00	35.00
Sheet bars, Pittsburgh.....	31.00	31.00	31.00	35.00
Slabs, Pittsburgh.....	31.00	31.00	31.00	35.00
Forging billets, Pittsburgh.....	36.00	36.00	36.00	40.00
Wire rods, Pittsburgh.....	36.00	36.00	36.00	42.00
Skelp, grvd. steel, P'gh, lb.....	1.70	1.70	1.70	1.85

Finished Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.65	1.65	1.65	1.95
Bars, Chicago.....	1.75	1.75	1.75	2.05
Bars, Cleveland.....	1.75	1.75	1.75	1.95
Bars, New York.....	1.98	1.98	1.98	2.29
Tank plates, Pittsburgh.....	1.65	1.65	1.65	1.95
Tank plates, Chicago.....	1.75	1.75	1.75	2.05
Tank plates, New York.....	1.93	1.93	1.93	2.22 1/2
Structural shapes, Pittsburgh.....	1.65	1.65	1.65	1.95
Structural shapes, Chicago.....	1.75	1.75	1.75	2.05
Structural shapes, New York.....	1.85 1/2	1.90 1/2	1.90 1/2	2.19 1/2
Cold-finished bars, P'gh.....	2.10	2.10	2.10	2.30
Hot-rolled strips, P'gh.....	1.65	1.65	1.65	1.90
Cold-rolled strips, P'gh.....	2.45	2.45	2.45	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Finished Steel,	Per Lb. to Large Buyers:			
	1930	1930	1930	1929
Sheets, black, No. 24, P'gh.....	2.45	2.45	2.55	2.85
Sheets, black, No. 24, Chicago dist. mill.....	2.60	2.65	2.65	3.05
Sheets, galv., No. 24, P'gh.....	3.10	3.10	3.15	3.60
Sheets, galv., No. 24, Chicago dist. mill.....	3.25	3.25	3.25	3.80
Sheets, blue, No. 13, P'gh.....	2.15	2.15	2.15	2.35
Sheets, blue, No. 13, Chicago dist. mill.....	2.25	2.25	2.25	2.45
Wire nails, Pittsburgh.....	2.05	2.05	2.05	2.60
Wire nails, Chicago dist. mill.....	2.10	2.10	2.15	2.65
Plain wire, Pittsburgh.....	2.30	2.30	2.30	2.50
Plain wire, Chicago dist. mill.....	2.35	2.35	2.35	2.55
Barbed wire, galv., P'gh.....	2.80	2.80	2.80	3.30
Barbed wire, galv., Chicago dist. mill.....	2.85	2.85	2.85	3.25
Tin plate, 100 lb. box, P'gh.....	\$5.25	\$5.25	\$5.25	\$5.35

Old Material, Per Gross Ton:

Heavy melting steel, P'gh.....	\$14.75	\$14.75	\$14.75	\$18.75
Heavy melting steel, Phila.....	12.50	12.50	12.50	16.50
Heavy melting steel, Ch'go.....	12.00	12.00	12.00	14.75
Carwheels, Chicago.....	13.50	13.50	13.50	14.00
Carwheels, Philadelphia.....	14.50	14.50	14.50	16.50
No. 1 cast, Pittsburgh.....	13.50	13.50	13.50	15.50
No. 1 cast, Phila.....	13.00	13.00	13.00	16.50
No. 1 cast, Ch'go (net ton).....	12.00	12.00	12.00	14.50
No. 1 RR. wrot., Phila.....	15.00	15.00	15.00	16.00
No. 1 RR. wrot., Ch'go (net).....	10.00	10.00	10.00	13.50

Coke, Connellsville,

Per Net Ton at Oven:				
Furnace coke, prompt.....	\$2.50	\$2.50	\$2.50	\$2.75
Foundry coke, prompt.....	3.50	3.50	3.50	3.75

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	11.12 1/2	11.12 1/2	12.12 1/2	18.12 1/2
Electrolytic copper, refinery.....	10.75	10.75	11.75	17.75
Tin (Straits), New York.....	29.87 1/2	29.62 1/2	30.05	47.25
Zinc, East St. Louis.....	4.75	4.40	4.10	6.80
Zinc, New York.....	5.10	4.75	4.45	7.15
Lead, St. Louis.....	5.15	5.15	5.15	6.55
Lead, New York.....	5.25	5.25	5.25	6.75
Antimony (Asiatic), N. Y.	7.12 1/2	6.87 1/2	7.00	8.62 1/2

PITTSBURGH

PITTSBURGH, July 29.—Despite talk of improved sentiment in the steel trade, Pittsburgh mills see very little concrete evidence of any resumption in demand. The past week has brought further curtailment of production schedules in sheet, strip and tin plate mills, and open-hearth furnace operations have been curtailed slightly at some points. Two independent steel company blast furnaces have been banked since the first of the month to conform with the low rate of open-hearth production, and a merchant stack has gone out in the Valleys.

In sharp contrast to the depressed state of business in other lines, production of line pipe is approaching capacity, and mills are still booking heavy tonnage. Pittsburgh and Valley mills are occupied until late in the year on line pipe larger than 10 in. in diameter, and prospective gasoline lines promise to absorb the remaining capacity for the smaller sizes before many weeks have passed.

The National Tube Co. has begun the production of electrically welded pipe in large diameters at its Christy, Pa., plant.

Reports from the automobile industry are confused, but generally hold out little encouragement for the steel mills. The Ford Motor Co. is expected to resume production next week, following a complete suspension for three weeks, but sharp curtailment during August on the part of other large motor manufacturers will

offset this gain to a large extent. The Buick company is stepping up its output to the highest point of the year on the new eight-cylinder models just brought out, and various units of the Chrysler corporation are also producing at a comparatively high rate. Parts manufacturing plants which have suspended operations during the

Ford shutdown will get back into production next week also. Unfortunately, most of these companies will begin production again with little or no increase in unfilled orders, which might have been expected to accumulate in the off period.

Demand for structural steel has failed to fulfill the promise of increased activity predicated on June business. In the immediate Pittsburgh district, new inquiry is light and awards have amounted to little heavy tonnage. Only the larger fabricating shops are running at more than half time. Local railroad car builders have booked orders during the week calling for 4500 tons of plates and shapes.

Railroads are beginning to show interest in their future rail requirements, and it is likely that a number of large carriers will place their contracts earlier than usual for the sake of possible improved business sentiment which might result. The fact that several of them are considerably behind in specifying against present

contracts is not likely to defer future commitments.

Steel prices still lack strength, although mills are generally able to secure the quoted figures on small-lot spot tonnage which is being placed from day to day. Wire nails have developed further weakness in the East and South, but in the Pittsburgh district quotations are holding at \$2.05 to \$2.15 a keg. On strip steel and sheets, the gradual abandonment of recent aggressive sales policies has made stabilization seem more imminent. Bars, plates and shapes are holding at 1.65c., Pittsburgh, in this territory, and there has been no change in the quoted prices on other steel commodities.

The scrap market continues to gain strength, although prices are not being tested by mill buying.

Pig Iron.—The market is listless, with carload lots forming the bulk of current business. Many foundries are running only two or three days a week, and radiator and sanitary ware makers, which are the largest consumers of foundry iron in the district, are running at a low rate. Shipments from merchant furnaces are hardly keeping pace with production, but yard stocks are not heavy, and the Struthers furnace in the Valleys has been blown out. Two independent steel company stacks have also been banked.

Cleveland iron is still a factor in this territory as well as in the Valleys, but the market is devoid of open inquiries, and business usually is developed only by means of aggressive solicitation. Prices on Valley and Pittsburgh furnace iron are unchanged, as quoted below.

Prices per gross ton, f.o.b. Valley furnace:
Basic \$18.00
Bessemer 18.50
Gray forge 17.50
No. 2 foundry 18.00
No. 3 foundry 17.50
Malleable 18.50
Low phos., copper free.... \$26.66 to 27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:
Basic \$18.50
No. 2 foundry 18.50
No. 3 foundry 18.00
Malleable 19.00

Freight rates to points in Pittsburgh district range from 63c. to \$1.13.

Evidence lacking of resumption in steel demand, but sentiment continues to be hopeful.

Further curtailment occurs in sheet, strip and tin plate mills and in open-hearth operations.

Large railroads may bring out annual rail inquiries earlier than usual to stimulate better business sentiment.

Pipe for gas and gasoline lines still being booked, and business in prospect is fairly large.

Reports from automobile industry confused, but hold little hope for steel mills during August.

Scrap market continues to gain strength.

Pittsburgh district are light. A machine shop in Pittsburgh, calling for 600 tons of shapes, has been let, and a local fabricator has taken 365 tons for a viaduct in Cincinnati. Little work is in prospect, although two large bridges in Pittsburgh will likely be out for bids in the fall or early winter. Plans are being prepared on both of these structures, one of which—the West End-North Side Bridge—is approaching the bidding stage. The Tenth Street Bridge across the Monongahela River will not come out for bids until somewhat later. Shipments of reinforcing bars are still heavy, although not much new work is coming out at this time.

Local car builders have recently benefited by the placing of 350 ore cars for the Anglo-Chilean Consolidated Nitrate Co. with the Pressed Steel Car Co. and of 32 air-dump cars for the Interlake Iron Corporation with the Koppel Industrial Car & Equipment Co. The ore cars will require about 3500 tons of plates and shapes, and the air dump cars about 1000 tons. Otherwise, car business is quiet, and old orders are rapidly being worked off.

Demand for alloy steel bars from the automobile industry is very dull, and cold-finishing mills, which ordinarily take a substantial tonnage from soft steel bar mills, have very light requirements. Prices show little change, with 1.65c., Pittsburgh, holding fairly well on bars, and 1.70c. obtainable on small lots. On plates and shapes shading is more frequent, but the Pittsburgh district market is not quotable at lower figures.

Semi-Finished Steel.—With the smaller non-integrated rolling mills as the principal users, shipments of semi-finished steel this month are at the lowest point of the year, and little or no new buying is reported. Users generally are under contract on the basis of \$31, Pittsburgh or Youngstown, on billets, slabs and sheet bars, and the price is untested. Forging billets are very dull, and occasional sales are being made at \$36, Pittsburgh. Shipments of wire rods are light, but have shown slight improvement in the last week as bolt and nut plants began to resume operations. The price is steady at \$36, Pittsburgh.

Bars, Plates and Shapes.—Current business is confined almost entirely to small lots, and specifications against old contracts are light. Shape mills are running at about 70 per cent of capacity, with plates at about 50 per cent, and bars even lower.

Structural awards in the immediate

Rails and Track Supplies.—Specifications last week from a few roads were slightly heavier, and mills rolling tie plates and other track equipment have been able to maintain a fair rate of operation so far this summer. The prospect for early placing of 1931 rail tonnage is rather good, and one road is credited with having contracted for its requirements considerably earlier than usual because of the possible favorable effect on business sentiment. The Van Sweringen roads have ordered approximately 60,000 tons and other carriers will be expected to enter the market in a few weeks. While

THE IRON AGE Composite Prices

Finished Steel

July 29, 1930, 2.171c. a Lb.

One week ago.....	2.171c.
One month ago.....	2.185c.
One year ago.....	2.412c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High	Low
1930	2.362c., Jan. 7	2.171c., July 15
1929	2.412c., April 2	2.362c., Oct. 29
1928	2.391c., Dec. 11	2.314c., Jan. 3
1927	2.453c., Jan. 4	2.293c., Oct. 25
1926	2.453c., Jan. 5	2.403c., May 18
1925	2.560c., Jan. 6	2.396c., Aug. 18

Pig Iron

July 29, 1930, \$16.96 a Gross Ton

One week ago.....	\$17.09
One month ago.....	17.42
One year ago.....	18.38

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low
1930	\$18.21, Jan. 7	\$16.96, July 29
1929	18.71, May 14	18.21, Dec. 17
1928	18.59, Nov. 27	17.04, July 24
1927	19.71, Jan. 4	17.54, Nov. 1
1926	21.54, Jan. 5	19.46, July 13
1925	22.50, Jan. 13	18.96, July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill.	1.65c. to 1.70c.
F.o.b. Chicago	1.75c. to 1.85c.
Del'd Philadelphia	1.94c.
Del'd New York	1.98c.
F.o.b. Cleveland	1.70c. to 1.75c.
F.o.b. Lackawanna	1.75c. to 1.85c.
F.o.b. Birmingham	1.90c.
C.i.f. Pacific ports	2.25c.
F.o.b. San Francisco mills	2.25c.

Billet Steel Reinforcing

F.o.b. Pgh mills, 40, 50, 60-ft.	1.60c. to 1.65c.
F.o.b. Pgh mills, cut lengths	1.90c. to 2.00c.
F.o.b. Birmingham, mill lengths	1.90c.

Steel

F.o.b. mills, east of Chicago dist.	1.65c. to 1.70c.
F.o.b. Chicago Heights mill	1.75c.
Del'd Philadelphia	1.94c. to 1.99c.

Iron

Common iron, f.o.b. Chicago	1.90c.
Refined iron, f.o.b. Pgh mills	2.75c.
Common iron, del'd Philadelphia	2.09c.
Common iron, del'd New York	2.14c.

Tank Plates

Base per Lb.

F.o.b. Pittsburgh mill	1.65c.
F.o.b. Chicago	1.75c. to 1.80c.
F.o.b. Birmingham	1.90c.
Del'd Cleveland	1.831/4c.
Del'd Philadelphia	1.801/2c. to 1.851/4c.
F.o.b. Coatesville	1.70c. to 1.75c.
F.o.b. Sparrows Point	1.75c.
F.o.b. Lackawanna	1.75c.
Del'd New York	1.93c.
C.i.f. Pacific ports	2.15c. to 2.25c.

Structural Shapes

Base per Lb.

F.o.b. Pittsburgh mill	1.65c.
F.o.b. Chicago	1.75c. to 1.80c.
F.o.b. Birmingham	1.90c.
F.o.b. Lackawanna	1.75c. to 1.80c.
F.o.b. Bethlehem	1.75c. to 1.80c.
Del'd Cleveland	1.831/4c.
Del'd Philadelphia	1.66c. to 1.76c.
Del'd New York	1.901/2c. to 1.951/4c.
C.i.f. Pacific ports	2.25c.

Hot-Rolled Hoops, Bands and Strips

Base per Lb.

6 in. and narrower, Pgh	1.70c. to 1.75c.
Wider than 6 in., Pgh	1.65c.
6 in. and narrower, Chicago	1.85c. to 1.90c.
Wider than 6 in., Chicago	1.75c. to 1.80c.
Cooperage stock, Pgh	1.90c. to 2.00c.
Cooperage stock, Chicago	2.00c. to 2.10c.

Cold-Finished Steel

Base per Lb.

Bars, f.o.b. Pittsburgh mill	2.10c.
Bars, f.o.b. Chicago	2.10c.
Bars, Cleveland	2.10c.
Bars, Buffalo	2.10c.
Shafting, ground, f.o.b. mill	*2.45c. to 3.40c.
Strips, Pgh	2.45c.
Strips, Cleveland	2.45c.
Strips, del'd Chicago	2.73c.
Strips, Worcester	2.60c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	3.70c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Merchant Trade

Base per Keg

Standard wire nails	\$2.05 to \$2.15
Cement coated nails	2.05 to 2.15
Galvanized nails	4.05 to 4.15

Base per Lb.

Polished staples	2.50c. to 2.60c.
Galvanized staples	2.75c. to 2.90c.
Barbed wire, galvanized	2.70c. to 2.85c.
Annealed fence wire	2.30c. to 2.40c.
Galvanized wire, No. 9	2.75c. to 2.85c.
Woven wire fence (per net ton to re-tailers)	\$65.00

To Manufacturing Trade

Bright hard wire, Nos. 6 to 9 gage	2.30c.
Spring wire	3.30c.

(Carload lots, f.o.b. Chicago)	
Wire nails	\$2.10 to \$2.15 (keg)
Annealed fence wire	2.40c. to 2.50c. (lb.)

Anderson, Ind., mill prices are ordinarily \$1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill \$2 a ton over Pittsburgh, and Birmingham mill \$3 a ton over Pittsburgh.	
Bright hard wire to manufacturing trade	.235c.

Light Plates

Base per Lb.

No. 10, blue annealed, f.o.b. Pgh	2.00c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.10c.
No. 10, blue annealed, del'd Phila.	2.32c. to 2.42c.
No. 10, blue annealed, B'ham	2.15c.

Sheets

Blue Annealed

Base per Lb.

No. 13, f.o.b. Pgh	2.15c.
No. 13, f.o.b. Chicago dist.	2.25c.
No. 13, del'd Philadelphia	2.44c.
No. 13, blue annealed, B'ham	2.30c.

Continuous Mill Sheets

Base per Lb.

No. 10 gage, f.o.b. Pgh	1.75c. to 1.80c.
No. 13 gage, f.o.b. Pgh	1.95c. to 2.00c.

(Usual range 24 in. to 48 in. wide)

Box Annealed, One Pass Cold Rolled

Base per Lb.

No. 24, f.o.b. Pittsburgh	2.45c. to 2.55c.
No. 24, f.o.b. Chicago dist. mill	2.60c. to 2.65c.
No. 24, del'd Philadelphia	2.84c.
No. 24, f.o.b. Birmingham	2.70c.

Steel Furniture Sheets

Base per Lb.

No. 24, f.o.b. Pgh	3.70c.
	Galvanized

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. \$10.30	25-lb. coating I.C. \$15.20
15-lb. coating I.C. \$12.90	30-lb. coating I.C. 16.00
20-lb. coating I.C. 14.00	40-lb. coating I.C. 17.80

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quantity Bar, Base, 2.65c. per Lb.

Alloy Numbers

Differential

2000 (1/4% Nickel)	\$0.25
2100 (1 1/2% Nickel)	0.55
2300 (3 1/2% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	0.20
6100 Chromium Vanadium Bar	1.20
6100 Chromium Vanadium Spring Steel	0.95
9250 Silicon Manganese Spring Steel (flats)	0.25
Rounds and squares	0.50
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

Base per Keg

Base per Lb.

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is 1/4c. a lb. higher, with standard classification for cold-finished alloy steel bars applying.

For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar price.

Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with a sectional area of less than 16 in. or less than 2 1/2 in. thick, regardless of sectional area, take the bar price.

Standard

Per Gross Ton

Standard, f.o.b. mill	\$43.00
Light (from billets), f.o.b. mill	34.00
Light (from rail steel), f.o.b. mill	32.00
Light (from billets), f.o.b. Ch'go mill	36.00

Base per 100 Lb.

Spikes, 1/2 in. and larger	\$2.50
Spikes, 1/2 in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	

some of the largest railroads in the country have been very slow in specifying against this year's contracts, few are likely to reduce purchases substantially for next year.

Tubular Goods.—Line pipe awards continue to dominate market interest, and, with Pittsburgh district companies booked for practically all the rest of the year on line pipe in sizes larger than 10-in. outside diameter, some new work is still being placed. The Great Lakes Pipe Line Co., controlled by the Continental Oil Co. and the Barnsdall Corporation, has placed 1400 miles of 4 to 8½ in. seamless pipe with the National Tube Co. for a gasoline-carrying line from Barnsdall, Okla., to several central Western cities. The line will take 75,000 tons of pipe. Interests identified with the Sun Oil Co. are expected to close in the near future on a 220-mile gas line from West Virginia and Kentucky to several Northern Ohio cities. Another active inquiry is that of the Columbia Gas & Electric Corporation for several hundred miles of 20-in. pipe to extend from West Virginia and Ohio gas fields to Washington, Baltimore, Atlantic City and Philadelphia. The Appalachian Gas Co. has not closed against its recent inquiry for 200 miles of 10½ and 12½-in. gas pipe for a line in Tennessee and Kentucky, while Clarence S. Dame, Inc., New York, has asked for bids on 276 miles of 8½-in., 6½-in. and 4½-in. gas pipe.

Wire Products.—The \$2.15, Pittsburgh, price on wire nails now applies in this district only to carload buyers, with \$2.05 generally representing the market to jobbers. Despite reports of weakness in other centers, the market here has achieved stability at the new levels. Business is very dull, and manufacturers' wire has failed to show any improvement. The price is holding at 2.30c., Pittsburgh.

Warehouse Business.—Prices on heavy hot-rolled steel products out of warehouse have been reduced \$3 a ton, with plates and shapes now quoted at 2.85c. a lb., base, or on orders of 400 to 3999 lb., and soft steel bars and small shapes at 2.75c. Prices are subject to the usual quantity differentials. Hoops and bands have also been reduced \$3 and are now quoted at 4.10c. and 3.10c. a lb. respectively.

Sheets.—With specifications showing only scattered improvement, sheet mill operations in this and nearby districts are lighter this week, and are estimated at 45 to 50 per cent of capacity. The higher figure is being maintained by only one or two producers, while several comparatively large makers are running at as low as 30 per cent. Although reports persist that the requirements of the automobile industry will improve considerably next month, current preliminary requisitions for sheet steel hardly justify this conclusion. One or two plants in the

Michigan district are well engaged on new models, but the largest interest is still suspended and other heavy volume makers are curtailing their schedules. Other sheet consuming industries have reduced their requirements to a minimum, and are buying for exceptionally speedy delivery because of reduced inventories.

No important price changes are in evidence, with black sheets quotable at 2.45c. to 2.55c., Pittsburgh; galvanized 3.10c. to 3.20c.; light plates at 2c., and blue annealed at 2.15c. Continuous mills are quoting 1.75c. rather freely on No. 10 gage material, and even lower figures have been named. Tin mill black plate is now quoted at 2.70c. to 2.80c., and long terne at 3.55c. to 3.65c. Automobile body sheets are holding at 3.60c., in the absence of any substantial buying.

Tin Plate.—Production schedules continue their downward trend in conformity with seasonal tendencies. Mills in the Pittsburgh district are running at about 65 per cent this week, and did little better in the previous comparable period. Hot weather did not interfere with last week's production as much as might be expected, partly because mill workers are not disposed to have their wages decreased in any way at this time. The protracted hot dry weather is undoubtedly affecting canning crops to some extent, although reports thus far do not indicate any damage of marked proportions.

Strip Steel.—Consumers of strip steel apparently are taking slightly more interest in their future requirements, although new business shows little improvement. Specifications are very light, but the first week in

Warehouse Prices, f.o.b. Pittsburgh

	*Base per Lb.
Plates	2.85c.
Structural shapes	2.85c.
Soft steel bars and small shapes	2.75c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.35c.
Squares and flats	3.85c.
Bands	3.10c.
Hoops	4.10c.
Black sheets (No. 24), 25 or more bundles	3.50c.
Galv. sheets (No. 24), 25 or more bundles	4.15c.
Light plates, blue annealed (No. 10), 1 to 24 plates	2.85c.
Blue annealed sheets (No. 13)	3.00c.
Galv. corrug. sheets (No. 28), per square	4.03c.
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.90c.
Track bolts, all sizes, per 100 count, 60 and 10 per cent off list	
Machine bolts, 100 count, 60 and 10 per cent off list	
Carriage bolts, 100 count, 60 and 10 per cent off list	
Nuts, all styles, 100 count, 60 and 10 per cent off list	
Large rivets, base per 100 lb.	\$3.30
Wire, black, soft ann'd, base per 100 lb.	\$2.60 to 2.70
Wire, galv. soft, base per 100 lb.	3.20 to 3.30
Common wire nails, per keg	2.45
Cement coated nails, per keg	2.65 to 2.80

*On plates, structural, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 3999 lb.

August promises heavier tonnage from some of the larger automobile factories and strip mills will be quick to reflect the added business in their operating schedules. Hot-strip mills are running at 35 to 45 per cent of capacity, with cold rolling units engaged at 20 to 25 per cent. Prices are unchanged and holding fairly well in the dull market which prevails. Hot-rolled strip wider than 6 in. is quoted at 1.65c., Pittsburgh, and the narrower widths at 1.70c. to 1.75c.

Cold-Finished Steel Bars and Shafting.—Practically no new buying is reported and specifications are at low ebb. The price, which showed a tendency toward weakness a few weeks ago, is again holding well at 2.10c., Pittsburgh.

Coke.—Several large producers of furnace coke are now quoting \$2.60, Connellsville, although material is still available at \$2.50. The low-priced product seems to be disappearing from the market, and, with production in the Connellsville regions at the lowest point in a number of years, a higher price seems in order.

Old Material.—The market has gained strength in the past week, despite the fact that no mill buying is reported. Dealers are meeting with increasing difficulty in covering \$15 contracts at a profit, and rejections are still common at one consuming point. It is more difficult than before for dealers to pick up scrap, and as much as \$14.75, and even \$15, has been paid on one or two occasions.

Hydraulic compressed sheets are also strong because of difficulty in securing this material for Pittsburgh shipping at inland Michigan points, but no change in the quotation is justified.

Dealers are not anxious to sell scrap at present levels and are convinced that the next move in the market will be upward.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	\$14.50 to \$15.00
No. 2 heavy melting steel	12.50 to 13.00
Scrap rails	14.50 to 15.00
Compressed sheet steel	14.75 to 15.00
Bundled sheets, sides and ends	12.00 to 12.50
Cast iron carwheels	15.00 to 15.50
Sheet bar crops, ordinary	15.50 to 16.00
Heavy breakable cast	11.50 to 12.00
No. 2 railroad wrought	14.50 to 15.00
Hvy. steel axle turnings	12.50 to 13.00
Machine shop turnings	8.50 to 9.00

Acid Open-Hearth Grades:	
Railr. knuckles and couplers	17.00 to 18.00
Railr. coil and leaf springs	17.00 to 18.00
Rolled steel wheels	17.00 to 18.00
Low phos. billet and bloom ends	19.00 to 19.50
Low phos. mill plates	16.50 to 17.00
Low phos. light grades	16.50 to 17.00
Low phos. sheet bar crops	17.50 to 18.00
Heavy steel axle turnings	12.50 to 13.00

Electric Furnace Grades:

Low phos. punchings	17.00 to 17.50
Heavy steel axle turnings	12.50 to 13.00

Blast Furnace Grades:

Short shoveling steel turnings	8.75 to 9.25
Short mixed borings and turnings	8.75 to 9.25

Cast iron borings:

Rolling Mill Grades:	8.75 to 9.25
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Steel car axles:

Steel car axles	21.50 to 22.50
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Cupola Grades:

No. 1 cast	13.00 to 14.00
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Rails 3 ft. and under

16.50 to 17.00

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

Per Gross Ton

Rerolling, 4-in. and under 10-in., Pittsburgh	\$31.00
Rerolling, 4-in. and under 10-in., Youngstown	31.00
Rerolling, 4-in. and under 10-in., Cleveland	31.00
Rerolling, 4-in. and under 10-in., Chicago	33.00
Forging quality, Pittsburgh	36.00

Sheet Bars

(Open Hearth or Bessemer)

Per Gross Ton

Pittsburgh	\$31.00
Youngstown	31.00
Cleveland	31.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

Per Gross Ton

Pittsburgh	\$31.00
Youngstown	31.00
Cleveland	31.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

Per Lb.

Grooved	1.70c.
Universal	1.70c.
Sheared	1.70c.

Wire Rods

(Common soft, base)

Per Gross Ton

Pittsburgh	\$36.00
Cleveland	36.00
Chicago	37.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Per Gross Ton

Old range Bessemer, 51.50% iron	\$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

Per Unit

Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
Iron ore, low phos., Swedish, average 68% iron	12.00c.
Iron ore, basic Swedish, average 65% iron	10.00c.
Manganese ore, washed 52% manganese, from the Caucasus	28.00c. to 30.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	28.00c. to 30.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$12.00 to \$14.00

Coke

Per Net Ton

Furnace, f.o.b. Connellsville prompt	\$2.50 to \$2.60
Foundry, f.o.b. Connellsville prompt	3.25 to 4.75
Foundry, by-products, Ch'go ovens	8.00
Foundry, by-products, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

Per Net Ton

Mine run steam coal, f.o.b. W. Pa. mines	\$1.25 to \$1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, 3/4-in., f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	.80 to .90
Gas slack, f.o.b. W. Pa. mines	.90 to 1.00

Ferromanganese

Per Gross Ton

Domestic, 80%, seaboard	\$94.00 to \$99.00
Foreign, 80%, Atlantic or Gulf port, duty paid	94.00 to 99.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	\$31.00 to \$33.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

Per Gross Ton Delivered

50%	\$88.50
75%	130.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton	Per Gross Ton
10%	\$26.50
11%	28.50
12%	30.50

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton	Per Gross Ton
6%	\$21.50
7%	22.00
8%	22.50
9%	23.00
10%	24.50

Other Ferroalloys

Ferro tungsten, per lb. contained metal del'd

Ferro chromium, 4 to 6% carbon and up, 65 to 70% Cr. per lb. contained Cr. delivered, in carloads

Ferro vanadium, per lb. contained vanadium, f.o.b. furnace

Ferro carbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads

Ferro phosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton

Ferro phosphorus, electric 24%, f.o.b. Alton, Ill., per gross ton

Fluxes and Refractories

Fluorspar

Per Net Ton

Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines

\$18.00

No. 2 lump, Illinois and Kentucky mines

20.00

Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid

\$18.00 to 18.50

Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/4% silica, f.o.b. Illinois and Kentucky mines

32.50

Fire Clay Brick

Per 1000 f.o.b. Works

High-Heat Intermediate

Duty Brick Heavy Duty Brick

Pennsylvania \$43.00 to \$46.00 \$35.00 to \$38.00

Maryland 43.00 to 46.00 35.00 to 38.00

New Jersey 50.00 to 65.00

Ohio 43.00 to 46.00 35.00 to 38.00

Kentucky 43.00 to 46.00 35.00 to 38.00

Missouri 43.00 to 46.00 35.00 to 38.00

Illinois 43.00 to 46.00 35.00 to 38.00

Ground fire clay, per ton

7.00

Silica Brick

Per 1000 f.o.b. Works

Pennsylvania \$48.00

Chicago 52.00

Birmingham 50.00

Silica clay, per ton

\$8.50 to 10.00

Magnesite Brick

Per Net Ton

Standard sizes, f.o.b. Baltimore and Chester, Pa.

\$65.00

Grain magnesite, f.o.b. Baltimore and Chester, Pa.

40.00

Standard size

45.00

Chrome Brick

Per Net Ton

Standard size

\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine bolts

Carriage bolts

Lag bolts

Flow bolts, Nos. 1, 2, 3 and 7 heads

Hot-pressed nuts, blank or tapped, square

Hot-pressed nuts, blank or tapped, hexagons

C.p.c. and t. square or hex. nuts, blank or tapped

Washers

7.00c. to 6.75c. per lb. off list

Bolts and Nuts

Per Cent Off List

Semi-finished hexagon nuts

Small Rivets

(7/8-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh 70, 10 and 5

F.o.b. Cleveland 70, 10 and 5

F.o.b. Chicago 70, 10 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding \$2.00 per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws

30, 10, 10 and 5

Milled standard set screws, case hardened

80 and 5

Milled headless set screws, cut thread

.75 and 10

Upset hex. head cap screws, U.S.S. thread

85 and 10

Upset hex. cap screws, S.A.E. thread

85 and 10

Upset set screws

80, 10 and 5

Milled studs

.70

Large Rivets

(1/2-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland \$2.90

F.o.b. Chicago 3.00

CHICAGO

Pig Iron Down 50c.—Tractor Plant and Two Motor Car Makers Step Up Production

CHICAGO, July 29.—Improvement in sentiment is the only gage in evidence at this time as to the course which the local iron and steel market will take in the immediate future.

Seventeen steel mill blast furnaces are in operation and three stacks are banked. The hot iron available, augmented by larger-than-usual portions of cold iron and scrap, is supporting ingot output at 55 per cent of capacity.

New sales and specifications give no clew as to the future. Commitments in the week are small in view of the passing of the first month of the third quarter and the fact that bookings for the present period are unusually meager except for plates, which remain in heavy demand from manufacturers of oil and gas industry commodities.

Among steel-consuming industries there are a few scattered signs of betterment of business. A foreign tractor order, others of which are in the making, will increase operations at a Milwaukee plant, and two automobile manufacturers in the Chicago area are stepping up production on new models. This situation is reflected in the pig iron market and in such commodities as bolts, nuts and rivets. On the other hand, it is reported here that the tendency in the Detroit district is to extend vacations another week, this already having been reflected in lighter specifications for hot and cold-rolled strip steel.

A further reduction of 50c. a ton on Northern pig iron appears to have convinced many buyers that this is the time to buy. New pig iron orders for the remainder of the third quarter and for the remainder of the year bulk large, making this one of the best weeks from the viewpoint of sales so far this year. However, business added to books is not an indicator of foundry melt, which is adversely affected by the business depression, the vacation period and uncommonly hot weather.

Sheets.—Improvement in orders noted a week ago did not carry through into the current week, and operations have been dropped 10 points to an average of 50 per cent of capacity. Quotations on black sheets have eased \$1 a ton to a range of 2.65c. to 2.70c. a lb., delivered Chicago. Tardiness of automobile manufacturers to resume operations following the vacation period is given as the foremost reason for the dullness of the sheet market.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.65c. to 2.70c.; No. 24 galv., 3.30c. to 3.35c.; No. 10 blue ann'l'd, 2.15c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Pig Iron.—A reduction of 50c. a ton on Northern iron is proving a strong stimulant in this market. Sales for delivery in the next two months and for the remainder of the year have reached such volume that, from the viewpoint of purchases, this is one of the best weeks so far this year. No. 2 iron is now quoted at \$17.50 for tonnages and at \$18 a ton

for small lots. Shipments in July will not equal the total in June, but releases for August indicate that a slight improvement will take place in deliveries early in the coming month. Five merchant stacks are in blast and are operating at about 65 per cent of capacity.

A cargo of special iron is due here from Lake Erie within the week. A boatload of silvery, prices for which are very weak, has been unloaded at a Chicago dock.

Prices per gross ton at Chicago:
 N'th'n No. 2 fdy., sil. 1.75
 to 2.25 \$17.50 to \$18.00
 N'th'n No. 1 fdy., sil. 2.25
 to 2.75 18.00 to 18.50
 Malleable, not over 2.25 sil. 17.50 to 18.00
 High phosphorus 17.50 to 18.00
 Lake Super. charc'l, sil. 1.50 27.04
 S'th'n No. 2 fdy. \$18.01 to 18.51
 Low phos., sil. 1 to 2, cop-
 per free 29.50
 Silvery, sil. 8 per cent 27.29
 Bess. ferrosilicon, 14-15 per
 cent 46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Bolts, Nuts and Rivets.—Automobile manufacturers who are now producing new models and tractor plants with new foreign orders at hand are entering larger specifications for these commodities. However, demand is

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel—	
30 to 500 tons	2.00c.
500 tons and over	1.85c.
Rail steel reinforcement	1.65c. to 1.75c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.35c.
Flats and squares	3.85c.
Bands (1/8 in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.60c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes (1/8 in. and larger)	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.

	Per Cent Off List
Machine bolts	60 and 10
Carriage bolts	60 and 10
Coach or lag screws	60 and 10
Hot-pressed nuts, sq. tap. or blank	60 and 10
Hot-pressed nuts, hex. tap. or blank	60 and 10
No. 8 black ann'l'd wire, per 100 lb.	\$3.45
Com. wire nails, base per keg	\$2.30 to 2.50
Cement c't'd nails, base per keg	2.30 to 2.50

generally light, as indicated by output, which is at about 40 per cent of capacity.

Coke.—Both shipments and new buying of by-product foundry coke are light. The price is unchanged at \$8 a ton, f.o.b. local ovens.

Ferroalloys.—Specifications are spotty and small in the aggregate.

Warehouse Business.—Movement of steel commodities from warehouses remains in moderate volume. Plates, shapes, bars, hoops and bands have been marked down 10c. a 100 lb.

Wire Products.—Several large producers are putting salesmen out on the road again after a mass vacation period of two weeks. Extremely hot and dry weather has prevailed throughout most of the country for several weeks, and this, it is felt by the trade, has retarded much improvement work. Unstable and low prices for farm products, notably corn and cotton, cast a shadow over the future of the wire business as it relates to outlying jobbers and distributors. The net result of the present situation is that wire mills are not producing above 40 per cent of capacity.

Mills report that they have sizable contracts, but that shipping instructions have shown no improvement in many weeks and there is only slight prospect that movement will be larger in the early part of August. Demand for wire rope remains very light from oil producers, but orders are in fair volume from other users. New business in electrical cables continues to run light, and backlog are dwindling, as shown by the fact that early in this year books were well filled to December, while promises of delivery are now readily made for the first two weeks in October. The long expected upturn in the radio field has not come, but there are signs, such as lower inventories, that indicate a change for the better is not far in the future. In the meantime, producers of magnet wire have accumulated large stocks. Unsettlement of wire and nail prices in some sections of the country continues to be a market factor.

Cold-Rolled Strip.—Extension of vacation periods in the automobile industry is serving to cut the volume of specifications, and output has worked down to 25 per cent of capacity. Quotations range from 2.35c., Cleveland, for carload lots to 2.45c. for smaller lots.

Hot-Rolled Strip.—Continued dullness in the manufacture of automobiles and the extension of vacation periods in that industry have resulted in lessened output of hot-rolled strip steel. The rate a week ago was 39 per cent of capacity for the industry

as a whole and it now stands at 35 per cent.

Rails and Track Supplies.—Inquiries for more than 90,000 tons of standard-section rails are now before the trade. The Chesapeake & Ohio will buy 58,000 tons, of which probably 42,000 tons will come to Chicago mills. The Reading, which makes its purchases in the East, will buy 35,000 tons. There is in prospect a moderate tonnage for 200 miles of new line that the Great Northern will lay in the Northwest. It often is the case, however, that new trackage laid in remote parts of the country does not demand heavy steel, and frequently railroads use old rail for work of this kind.

Of special interest in the local market are releases against old orders for 9000 tons of rails. The rails will go forward to several Western railroads which have been tardy in carrying through programs which they set last fall when they made purchases for delivery in 1930. Operations by local rail mills are spasmodic and therefore lend little support to the current rate of ingot output. The light rail market is dull.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Besse. rails, \$43; light rails, rolled from billets, \$36. **Per lb.:** Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.07 1/4c. to 2.15c.; angle bars, 2.75c.

Cast Iron Pipe.—Milwaukee has closed on about 6300 tons of 54-in. pipe for a delivered price of \$39.20 a ton. The freight rate from Birmingham to Milwaukee is \$8.40, and therefore the price figures back to \$30.80 a ton at Birmingham. In addition to the above tonnage, there was also involved in this order 100 tons of 20-in. pipe, 225 tons of 54-in. lugged pipe and 200 tons of special castings.

Private buying, especially by public utilities, is on the upturn, although the volume of orders now coming to producers from this source will make little impression on order books which permit prompt deliveries of most sizes.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$45 to \$46; 4-in., \$48 to \$49; Class A and gas pipe, \$3 extra.

Plates.—The 6000 tons of steel needed for the 500 cars ordered last week by the Minneapolis & St. Louis lends only moderate support to steel mills, which are anxious for added tonnage of this miscellaneous character, and it will give little aid to car shops which two months ago needed new contracts to maintain the rate of production that had been established earlier in the year. Except for 95 ingot cars to be purchased by the Illinois Steel Co., there is little of interest in the railroad equipment market, although it is true that the Illinois Central has not officially withdrawn its old inquiry for 2300 cars.

Several miscellaneous orders for tanks call for 4000 tons of steel, and fresh inquiry of like character is developing. Recent orders for plates for line pipe manufacture have tended to swell order books and to hold plate

Further reduction of 50c. a ton on pig iron stimulates placing of large tonnage.

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Steel trade sentiment improves, but orders are not gaining.

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A tractor plant and two automobile manufacturers step up production.

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Steel orders offer little or no indication of the future trend.

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Scrap market at low point both as to demand and prices, but recovery is not yet in sight.

mill schedules on a far more satisfactory basis than the schedules of other finishing departments. Deliveries on a few sizes used for line pipe are somewhat deferred, while most of the common sizes can be had on short notice.

Bars.—Demand for this commodity has shown little change in several weeks. Output continues at 50 per cent of capacity. Use by the automobile industry is small, and agricultural implement manufacturers are still uncertain as to the course that will be taken in nearby months. Although road machinery builders are less active than earlier in the summer, the rate at which they are specifying indicates that they are well engaged. Most bar mill products can be had promptly.

Structural Material.—Awards, at 12,000 tons, and fresh inquiries of 5000 tons mark this as one of the outstanding weeks in July. It is noteworthy that a large part of the tonnage placed this week is for highway bridge work, 1600 tons of the total having been contributed by the State of Illinois. The future of the building situation in and close to Chicago remains a puzzle. Shop operations are far from satisfactory and few projects get beyond the preliminary plan stage. The bulk of the heavy tonnage requirements for the expansion program of the Illinois Steel Co. has been fabricated, and interior details are now reaching shops.

Old Material.—The local scrap iron and steel market is at a standstill. Brokers have covered many old orders and buyers are keeping a close watch on the trend of business before making commitments beyond meager orders for the immediate future. The stagnation which prevails is clearly shown by the fact that many local yards have virtually suspended operations. Many of them not only have stopped taking in scrap, but they also have stopped preparing it. Back of

all this is a feeling which is taking root in the trade that the bottom of prices has been reached, but no marked improvement either in billings, which are at the low point of the year, or in prices is expected before the early fall months.

Railroad lists are small, which is a helpful situation in a market such as this, when dealers can easily become pressed by distress tonnage. Many brokers are finding themselves in peculiar positions, where they have purchased and sold industrial scrap and now find that owing to the low rate of industrial activity this scrap cannot be obtained for delivery against their commitments. Large users who placed restrictions on shipments over a month ago are not finding this an opportune time to lower the bars and they give no encouragement to dealers as to when a change of policy may occur.

Use of scrap by gray iron foundries is very spotty. Steel foundries seem to be faring better as to the steadiness of the run of business, but operations generally are at low levels. The only railroad offering of note this week is 4000 tons by the Chicago & North Western.

Prices deliv'd Chicago district consumers:

Per Gross Ton

Basic Open-Hearth Grades:

Heavy melting steel	\$12.00 to \$12.25
Shoveling steel	12.00 to 12.25
Frogs, switches and guards, cut apart, and misc. rails	13.00 to 13.50
Hydraulic, compressed sheets	10.25 to 10.75
Drop forge flashings	8.50 to 9.00
No. 1 busheling	9.50 to 10.00
Forg'd cast and r'l'd steel carwheels	15.00 to 15.50
Railroad tires, charg. box size	15.50 to 16.00
Railroad leaf springs cut apart	15.50 to 16.00

Acid Open-Hearth Grades:

Steel couplers and knuckles	13.50 to 14.00
Coil springs	16.00 to 16.50

Electric Furnace Grades:

Axle turnings	11.25 to 11.75
Low phos. punchings	13.00 to 13.50
Low phos. plates, 12 in. and under	13.00 to 13.50

Blast Furnace Grades:

Axle turnings	9.50 to 10.00
Cast iron borings	7.75 to 8.25
Short shoveling turnings	7.75 to 8.25

Machine shop turnings:

6.00 to 6.50

Rolling Mill Grades:

Iron rails	13.00 to 13.50
Rerolling rails	14.50 to 15.00

Cupola Grades:

Steel rails, less than 3 ft.	13.75 to 14.25
Steel rails, less than 2 ft.	14.50 to 15.00
Angle bars, steel	13.25 to 13.75
Cast iron carwheels	13.50 to 14.00

Malleable Grades:

Railroad	13.50 to 14.00
Agricultural	12.25 to 12.75

Miscellaneous:

*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:

Iron angle and splice bars	12.00 to 12.50
Iron arch bars and trans-	13.50 to 14.00
soms	24.00 to 24.50
Iron car axles	15.00 to 15.50
No. 1 railroad wrought	9.75 to 10.25
No. 2 railroad wrought	10.75 to 11.25
No. 1 busheling	7.50 to 8.00
No. 2 busheling	6.00 to 6.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	8.00 to 8.50

Cupola Grades:

No. 1 machinery cast	12.00 to 12.50
No. 1 railroad cast	10.25 to 10.75
No. 1 agricultural cast	9.50 to 10.00
Stove plate	9.50 to 10.00
Grate bars	8.50 to 9.00
Brake shoes	8.50 to 9.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

NEW YORK

Pig Iron Sales Heaviest Since April—Steel Dull, Prices Still Weak

NEW YORK, July 29.—Pig iron sales for the week are the largest since April, totaling 10,000 tons. The largest individual purchase was by the Thatcher Co., Newark, N. J., which bought against its inquiry for 2000 tons, dividing the business equally between an eastern Pennsylvania furnace and a Buffalo producer. Insistence that the iron be delivered a carload at a time is said to have militated against the purchase of Alabama iron. No other large inquiries are before the trade, but the volume of small business coming to light, usually without being generally advertised, is said to be increasing.

Foundry operations remain at a low rate, with some important plants still idle, and most sellers complain of a dearth of shipping instructions. On the other hand, one important broker estimates that his July shipments will show a gain of more than 25 per cent over those of June.

Prices show little change, being subject to variation according to the way competition works out for various deliveries. Although the usual quotation on eastern Pennsylvania iron in this vicinity figures back to \$18, furnace, some transactions have brought out delivered prices equivalent to 25c. to 50c. less than that figure.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	\$20.91
*Buff. No. 2, del'd east. N. J.	19.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	19.39
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	19.89

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Reinforcing Bars.—There continues to be a dearth of large awards, but bookings in lots of less than 100 tons are said to be holding up rather well. Mill prices are still flexible, but on subway work in which steel conforming to rigid specifications is called for 1.85c., Pittsburgh, is still the ruling quotation. Warehouse prices also are irregular, with 2.40c. a lb., f.o.b. cars, New York, ruling on smaller tonnages than formerly.

Concrete bars in 40, 50 and 60-ft. lengths for mill shipment are quoted at 1.75c. to 1.85c. a lb., base Pittsburgh. Warehouse prices range from 2.40c. a lb., f.o.b. cars, New York, to 3.24c.

Finished Steel.—Aside from continuing activity in structural steel, the local steel situation shows no signs of the expected improvement in demand. Most sellers agree that August will bring little change and that the steel trade must wait until September for perceptible gains. New structural projects in the New York district reported in this issue of THE IRON AGE total 18,500 tons, and awards were fairly good at about 14,000 tons, though 13,000 tons was

for one building, to be built by the New York Telephone Co. Of the new projects, the largest are 5500 tons for an office building at Broad and Bridge Streets, 3000 tons for an office building at Third Avenue and Forty-third Street, both New York, and 2000 tons for a dormitory at Harvard University. Because of the low prices prevailing on structural material, it is expected that awards in the next few weeks will be fairly heavy.

The New York Central Railroad is expected to come into the market early in September for its annual requirements, which last year totaled about 200,000 tons.

Weakness persists in some steel products, despite the fact that prices are in many instances unprofitably low. Wire nails have been sold at \$2 a keg, and in at least one case this price was shaded. Cold-rolled strip steel, in carload lots, has gone as low as 2.35c., Pittsburgh or Cleveland, the lowest price since the product was put on the market. On small lots producers still get 2.45c. Plates are being held at 1.75c., Coatesville, Pa., on most of the current orders, but 1.70c. quotations are available on attractive orders. Structural steel competition is keen, with some prices figuring back to 1.60c., Eastern mill, though 1.70c. to 1.75c., Bethlehem, are the common quotations. Blue annealed sheets have on

a few occasions been shaded \$1 a ton to 2.10c. for No. 13 gage and to 1.95c. for No. 10 gage.

Warehouse Business.—While galvanized sheet prices out of stock are being fairly well maintained at 4.25c. a lb., base, black and blue annealed sheets are still subject to shading of \$1 to \$2 a ton and more. Demand for small lots of structural material has improved slightly as the present restricted operating rates of mills causes delays in delivery when a wide range of sizes is in a small order.

Cast Iron Pipe.—Operating rates of Northern foundries continue at 70 to 75 per cent of capacity, but a diminishing tonnage of new business is being booked. Private buying continues to furnish most of the current business. Prices are unchanged at \$36 to \$37 a ton, f.o.b. foundry.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, \$38.90 to \$39.90; 4-in. and 5-in., \$41.90 to \$42.90; 3-in., \$48.90 to \$49.90. Class A and gas pipe, \$3 extra.

Coke.—Standard furnace coke is unchanged at \$2.50 to \$2.60 a net ton, Connellsburg, with demand small. Distress carloads are less common than a few weeks ago, but are still occasionally offered at \$2.40, Connellsburg. Foundry coke prices are unchanged, as follows:

Special brands of beehive foundry coke, \$4.85 a net ton, ovens, or \$8.56 delivered to northern New Jersey, Jersey City and Newark, and \$9.44 to New York and Brooklyn: by-product foundry coke, \$9 to \$9.40, Newark or Jersey City: \$10.06, New York or Brooklyn.

Old Material.—No. 1 heavy melting steel is quoted at \$9 a ton, New York, for shipment to eastern Pennsylvania mills and at \$10, on barge New York, for delivery to Buffalo. Although the price paid for shipment to Buffalo was reduced 50c. a ton a week ago, dealers report a substantial tonnage available at the new quotation. Other grades of scrap are quiet, with consumer buying limited to small lots of material for immediate requirements.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	\$9.00 to \$10.00
Heavy melting steel (yard)	5.75 to 6.25
No. 1 hvy. breakable cast	7.75 to 8.50
Stove plate (steel works)	6.00 to 6.50
Locomotive grate bars	6.00 to 6.50
Machine shop turnings	5.00 to 5.50
Short shoveling turnings	5.00
Cast borings (blast fur. or steel works)	6.00
Mixed borings and turnings	5.00
Steel car axles	17.00
Iron car axles	19.00 to 19.50

Iron and steel pipe (1 in. dia. not under 2 ft. long)

Forge fire

No. 1 railroad wrought

No. 1 yard wrought, long

Rails for rolling

Stove plate (foundry)

Malleable cast (railroad)

Cast borings (chemical)

Prices per gross ton, deliv'd local foun-

dries:

No. 1 machry. cast

No. 1 hvy. cast (columns, bldg. ma-

terials, etc.); cupola size

No. 2 cast (radiators, cast boilers, etc.)

11.50

PHILADELPHIA

Shape Prices Firmer—Business Slightly Better—Reading Rail Inquiry Out

PHILADELPHIA, July 29.—Recent additional curtailment in mill operations to an average of 50 per cent of capacity has brought steel production more nearly to the level of current requirements, so that prices are less inclined to weakness. Consumption in certain industries appears to be improving slightly, especially among manufacturers using sheets and among the fabricating shops, but prices are generally unchanged. Shipbuilders are still awaiting substantial contracts to add to their already well-filled schedules and are preparing to quote on six vessels for the Grace Line, requiring a total of 30,000 tons of plates, shapes and bars.

Railroad buying is still limited, but preliminary estimates of rail requirements next year by the Pennsylvania Railroad are about 10 per cent less than for 1930. As total purchases this year, including options, are expected to reach about 200,000 tons, next year's order would be about 180,000 tons. The Reading Railroad, which contracted for about 30,000 tons of rails last year, is inquiring for 35,000 tons for 1931.

Pig Iron.—Shipments of foundry iron are generally limited to orders for one or two carloads, but buyers with contracts have been specifying more freely than earlier this year. Eastern Pennsylvania foundry iron is quoted at \$19 a ton, furnace, on orders for one or two carloads, but \$18.50 furnace, usually applies on more desirable business. Southern foundry iron is still being offered at \$12.50 a ton, Birmingham, and a fair tonnage in small lots continues to move into eastern Pennsylvania. Basic consumers are apparently interested in buying, but no purchases have been made since a Coatesville, Pa., mill bought a week ago. Low phosphorus iron is quiet, but the price is firm.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sll.	\$19.26 to \$19.76
2.75 sll.	19.76 to 20.26
East. Pa. No. 1X.	20.26 to 20.76
Basic (del'd east. Pa.)	18.25 to 18.50
Malleable	21.25
Stand. low phos. (f.o.b. east. Pa. furnace)	24.00
Cop. b'rg low phos. (f.o.b. furnace)	23.00 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sll.	22.29
Va. No. 2X, 2.25 to 2.75 sll.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Steel Bars.—Only carload lots and less are being bought, and the price is unchanged at 1.65c. a lb., Pittsburgh, or 1.94c. per lb., delivered Philadelphia.

Reinforcing Bars.—Some small reinforced concrete projects are in the market, including 100 tons for a bridge at Chester, Pa.; 115 tons for a water supply reservoir at Fairview, Pa.; 400 tons for a newspaper building in Chester, and 155 tons for a memorial building at the Hill School, Pottstown, Pa. Competition for business is keen. Billet steel bars are quoted at 1.75c. to 1.85c. a lb., Pittsburgh, or 2.04c. to 2.14c., delivered Philadelphia, with the extra for cutting to length usually omitted. Rail steel bars range from 1.60c. to 1.65c., Franklin, Pa., or 1.89c. to 1.94c., delivered Philadelphia.

Shapes.—Mill operations are not in excess of 50 per cent, and, with demand moderate, prices are showing slightly more stability than for some months. Quotations of 1.60c. a lb., f.o.b. nearest mill to consumer, are becoming less common, the usual quotations being 1.65c. to 1.70c., mill, or 1.71c. to 1.76c., delivered Philadelphia.

Plates.—The market is being maintained at 1.75c. a lb., f.o.b. Coatesville, Pa., or 1.85 1/2c., delivered Philadelphia, except on the sizable tonnages, which sometimes bring a concession of \$1 a ton. While new business is still small, the tonnage being booked at present is sufficient to maintain the present operating rates of 50 per cent of capacity and less.

Sheets.—Consumers are showing more interest in small lots of sheets, but have not yet placed much business with mills. Blue annealed sheets are unchanged at 2.15c. a lb., Pittsburgh, or 2.44c., delivered Philadelphia, for No. 13 gage and blue annealed plates are 2c., Pittsburgh, or 2.29c., Philadelphia, for No. 10 gage. Black sheets have generally settled to 2.45c., Pittsburgh, or 2.74c., delivered Philadelphia, and galvanized sheets are 3.10c., Pittsburgh, or 3.39c., delivered Philadelphia.

Imports.—In the week ended July

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, 1/4-in. and heavier	2.60c.
Structural shapes	2.60c.
Soft steel bars, small shapes, iron bars (except bands)	2.70c.
Reinforce. steel bars, sq. twisted and deform.	2.60c. to 2.70c.
Cold-fin. steel, rounds and hex.	3.40c.
Cold-fin. steel, sq. and flats	3.90c.
Steel hoops	3.25c.
Steel bands, No. 12 to 1/2-in. inclus.	3.00c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.70c.
†Galvanized sheets (No. 24)	4.25c.
Light plates, blue annealed (No. 10)	3.15c.
Blue ann'd sheets (No. 13)	3.30c.
Diam. pat. floor plates, 1/4-in.	5.30c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

26, arrivals at this port consisted of 5000 tons of iron ore from Algeria, 1010 tons of pig iron from British India, 24 tons of steel bars from Belgium, 27 tons of structural shapes and eight tons of steel tubes from Germany, seven tons of steel billets from Sweden and five tons of steel strips from the United Kingdom.

Old Material.—The only scrap transaction of any consequence in the past few weeks was the purchase of about 1200 tons of No. 1 heavy melting steel by a Coatesville, Pa., mill at \$12.50 a ton, delivered. Other grades are quiet and prices substantially unchanged in the absence of buying.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$12.50 to \$13.00
No. 2 heavy melting steel	10.00 to 10.50
Heavy melting steel (yard)	10.00
No. 1 railroad wrought	15.00 to 15.50
Bundled sheets (for steel works)	9.50
Hydraulic compressed, new	11.00 to 11.50
Hydraulic compressed, old	9.50
Machine shop turnings (for steel works)	9.00
Heavy axle turnings (or equiv.)	11.50 to 12.00
Cast borings (for steel works and roll. mill)	8.75 to 9.00
Heavy breakable cast (for steel works)	11.50 to 12.00
Railroad grate bars	10.00
Stove plate (for steel works)	10.00
No. 1 low phos. hvy. 0.04% and under	20.00
Couplers and knuckles	17.50 to 18.00
Rolled steel wheels	17.50 to 18.00
No. 1 blast f'nace scrap	8.50 to 8.75
Wrot. iron and soft steel pipes and tubes (new specific)	11.50 to 12.00
Shafting	18.00 to 18.50
Steel axles	21.00 to 21.50
No. 1 forge fire	12.00
Cast iron carwheels	14.50 to 15.00
No. 1 cast	13.00 to 13.50
Cast borings (for chem. plant)	13.50 to 14.00
Steel rails for rolling	13.50 to 14.00

Borings and Turnings Down 50c. at Detroit

DETROIT, July 29.—Borings and short turnings have declined 50c. a ton, which reflects reduced blast furnace production, while other prices on old material in the district remain the same as quoted a week ago.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	\$11.00 to \$11.50
Borings and short turnings	6.25 to 6.75
Long turnings	5.75 to 6.25
No. 1 machinery cast	11.25 to 11.75
Automotive cast	13.50 to 14.00
Hydraul. comp. sheets	10.50 to 11.00
Stove plate	9.00 to 9.50
New No. 1 busheling	9.50 to 10.00
Old No. 1 busheling	8.75 to 9.25
Sheet clippings	8.00 to 8.50
Flashings	9.75 to 10.25

The by-product coke and gas industry will be the subject of a special radio program to be broadcast by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., on Aug. 5, at 9 p. m. Eastern standard time.

CLEVELAND

Small Steel Orders from Scattered Sources Gain—C. & O. Buys 58,600 Tons of Rails

CLEVELAND, July 29.—The finished steel market showed a little more life during the past week than for some time owing to an increase in small-lot orders from scattered sources, although some of the sheet mills suffered from an extension of the shutdown by the Ford Motor Co. The volume of business during July will show a moderate gain over that of June. The Ford company, which was scheduled to resume operations July 28, after a two weeks' shutdown, decided to remain idle a week longer and consequently held back on releases for sheets. This has resulted in a curtailment of sheet mill operations, and two Ohio mills are shut down this week.

Steel plant operations in Cleveland were curtailed this week by the shutting down of three open-hearth furnaces. Local plants are now operating at 50 per cent of ingot capacity, a loss of 8 points.

Sheet shipments for Chevrolet bodies are tapering off, as that company is preparing to make changes in its body design. Some of the automobile manufacturers who have brought out new models are ordering material somewhat more freely than recently. August output of motor cars is expected to show a moderate gain over that of July. Operations by other metal-working industries are spotty, but on the whole show little change. In view of the extremely hot weather, some plants that shut down for two weeks have extended their vacation period.

There is little change in the price situation. The sheet market is still weak, and cold-rolled strip is being shaded to 2.35c.

Pig Iron.—Sales and inquiries were rather light the past week. The only large inquiry is for 1000 tons of foundry iron from a southwestern Ohio implement manufacturer. A Canton, Ohio, consumer bought about 800 tons, dividing the business among several producers. Most foundries continue to buy iron in small lots as needed. For shipment to competitive points, a \$17, Lake furnace, price has become more common, although \$17.50 is the usual quotation by Cleveland furnaces for outside shipment. These furnaces are holding to \$18 for local delivery. In western Ohio and northern Indiana, the spread of \$17.50 to \$18 continues. Prices are easier in Michigan, where \$18 has become the ruling quotation for most points.

Shipments show no improvement and the total for July will fall considerably below that of June. Some foundries that shut down for two weeks have extended their vacation periods. The Otis Steel Co. shortly will blow out one of its Cleveland furnaces for relining and repairs.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	\$18.00
S'th'n fdy., sil. 1.75 to 2.25	\$18.51 to 19.51
Malleable	18.00
Ohio silvery, 8 per cent...	25.50 to 26.50
Basic Valley furnace....	18.50
Stand. low phos., Valley...	26.50 to 27.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 50c. average local switching charge; \$3 from Jackson, Ohio; \$6.01 from Birmingham.

New England Building, and a 20-story Professional Arts Building. Estimates of the steel requirements have not been completed. A 1200-ton lot of reinforcing bars has been placed for the Central Lorain Bridge, Cleveland. Prices are steady at 1.70c., Cleveland, for steel bars for outside shipment, 1.75c. for local delivery and 1.65c., Pittsburgh, for plates and shapes.

Strip Steel.—Hot-rolled strip picked up somewhat during the week in small miscellaneous orders, and mills took some business in cold-rolled strip, which has been almost at a standstill recently. While concessions of \$1 a ton are reported on hot-rolled material, these appear to be confined to makers of cold-rolled strip. Concessions to 2.35c., Cleveland, are being made on cold-rolled strip, although most mills are still holding to 2.45c. Fender stock has settled to a flat 3.70c. price.

Wire Products.—Nails appear to be holding locally at \$2.10 a keg, but in some sections of the State that price is reported on small lots. Manufacturers' wire is firm at 2.30c., Cleveland. Demand is light.

Old Material.—Locally the market is almost at a standstill. One mill that has been taking a moderate amount of scrap has ordered shipments discontinued at the end of the week. There is a limited demand in the Valley district from dealers, who are paying \$14.50 to \$15 for heavy melting steel and \$14.25 for compressed sheet steel. Prices show no change and the opinion is quite general that with the present low levels they are not likely to go lower.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:

No. 1 heavy melting steel	\$11.75 to \$12.25
No. 2 heavy melting steel	11.25 to 11.50
Compressed sheet steel	12.25 to 12.50
Light banded sheet stampings	11.00 to 11.50
Drop forge flashings	10.00 to 10.50
Machine shop turnings	8.00 to 8.50
Short shoveling turnings	9.75 to 10.25
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	14.00 to 14.50
No. 1 busheling	11.75 to 12.00
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00

Acid Open-Hearth Grades:

Low phos., forging crops	17.75 to 18.00
Low phos., billet bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50

Blast Furnace Grades:

Cast iron borings	9.00 to 9.25
Mixed borings and short turnings	9.00 to 9.25
No. 2 busheling	8.75 to 9.00

Cupola Grades:

No. 1 cast	15.00 to 15.50
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.50 to 19.50

Miscellaneous:

Rails for rolling	16.25 to 16.50
Railroad malleable	16.00 to 16.50

DETROIT

DETROIT, July 29.—Just at the time when it was hoped that the plant vacation period had about run its course, the iron and steel industry was disappointed by the unexpected announcement of the Ford Motor Co. that it would not resume operations until Aug. 4 instead of July 28, as originally planned. That this decision was reached at the last moment is indicated by the fact that the company had given release orders on the delivery of materials to be on the ground for use during the week of July 28, but on July 21 sent out telegrams rescinding these instructions. There are some reports that Ford dealers in many parts of the country have accumulated excessive stocks and that for this reason the shutdown of the Ford production machinery may be extended into a fourth week.

Other automobile plants which have halted activities for two weeks include the Oakland-Pontiac and the Cadillac-LaSalle divisions of General Motors, Packard and Fisher Body at Pontiac. The Briggs and Murray body factories have been seriously affected by the sluggish demand from automobile companies and therefore have been taking only meager tonnages of steel. Hudson-Essex has a low schedule following its two-weeks' vacation and will not do much in August. One of the few active spots has been the Chevrolet plant, which is turning out this month more cars than its first schedule of 55,000 units. Studebaker is succeeding in doing something which every automobile manufacturer tries to do, but rarely accomplishes—getting its "free wheeling" system discussed as a topic of general interest by the motoring public. Incidentally, Studebaker is putting through 350 to 400 jobs a day working five days a week and its plans for the next 30 days call for a substantial output.

With Ford down for 14 working days in July, automobile production has declined to about 35,000 cars a week, or approximately half of the output early in the month. Other companies have contributed to the holiday spirit, but their total does not affect the situation so acutely. The result is that the industry during July probably has manufactured about 220,000 cars, a considerable decline from the previous low month of January. It is almost certain that the present rate for the industry will carry over into August, with production next month being near the July figure.

Automotive executives are not trying to create a mirage of optimism to satisfy their desire for better conditions. They realize that general business and industry are not in a sufficiently prosperous state to justify

Slow August Expected in Motor Industry— Ford Shutdown Extended a Week

With Ford shutdown extended to Aug. 4, delivery of steel and other materials is postponed.

* * *

Buick, Chevrolet and Studebaker plants are the busiest.

* * *

Buick's new model in demand from dealers, with orders totaling 15,000 units.

* * *

August production expected to show only moderate gain over that of July.

* * *

Studebaker to engage actively in truck and bus manufacturing field.

high hopes for the remainder of the year. Even with the battle among the medium-price makers resulting in an influx into the market of new straight-eight models, the buying public seems only mildly interested. It is doubtful whether output in the last half of 1930 will be more than 1,200,000 to 1,500,000 units. This would put production for the year well under 4,000,000 cars, which was the figure many in the industry predicted early in the year.

THE remarkably good earnings of General Motors in the second quarter and, in fact, during the entire first half of 1930 have been cause for comment on the part of people close to the automobile industry. On the basis of the margin of profit on each car, earnings were about the same as in 1929. The falling off in total net profits was almost directly in proportion to the decrease in the number of cars sold. This is considered a tribute to the efficient management of General Motors subsidiaries. A material reduction in operating costs has been mainly responsible for the ability of the individual companies comprising the corporation to make money during a year which has brought the profits of many competitors hurtling down from the heights attained in 1929. That an organization as large as General Motors can have sufficient flexibility to make drastic changes in operating methods almost overnight is thought by many observers to be further vindication of its policies and is a constant source of amazement to companies in other industries which by tradition and education move more slowly.

In appearance the new Buick eight

differs little from its predecessor. It naturally has some refinements which will serve as selling points for dealers, but its chief mechanical feature, aside from the addition of two cylinders, is the adoption of the Cadillac synchronous gearshift eliminating the clashing of gears in shifting speeds. Prices are in the same range as the Buick six. Buick is counting on great things from its new product and believes that it finally has a car which will restore it to the popularity enjoyed prior to the introduction of the "bulging Buick." It is reported that the new Buick eight has been tested on the General Motors proving ground for the past four years and has been pronounced foolproof by Buick engineers. With automobile sales seasonally dull and the situation made worse by the present reluctance of the public to invest its money, Buick is courageous in bringing out its new car at this time. On the other hand, orders from dealers are said to aggregate more than 15,000 units. The Buick plant at Flint, Mich., is operating at a good rate and the August schedule is expected to be close to that of July.

THE Studebaker Corporation and the Pierce Arrow Motor Car Co. have formed a new company, the S. P. A. Corporation, to enter vigorously into the truck and bus manufacturing fields. Trucks up to 1½ tons' capacity and small buses will be made by Studebaker at South Bend, Ind., while heavy trucks and buses will be produced at the Pierce-Arrow factory at Buffalo. The announcement of the formation of the new company is of more than passing importance for several reasons.

Pierce-Arrow built trucks under its own name for many years and its reputation for quality passenger cars extended into the truck business. For some time, however, it has not been making trucks and the organization of the new corporation marks its reentry into this field. That its plans provide for the production of massive units is revealed by the fact that the springs for some of the large trucks will be made of steel plates 5 in. wide and 7/16 in. thick.

Studebaker, on the other hand, has never gone into the truck market in an aggressive manner. Its efforts have been confined principally to adaptations of its passenger cars in chassis, engine and other mechanical designs. It has gone into the manufacture of buses on a somewhat larger scale. Lagging behind other companies in the output of trucks and buses, nevertheless Studebaker has achieved a unique distinction. It established itself as the world's largest builders of hearses and ambulances,

a fact little known. The new setup provides for a separate engineering division to work exclusively on the design of trucks and buses. The organization will capitalize on the Studebaker and Pierce-Arrow reputations and expects to put out a product which justifies such expectations. Production is about ready to begin at both South Bend and Buffalo. Operations will go along on a small scale until the company can get an accurate conception of what the public thinks of its products.

THE Great Lakes Steel Corporation has lighted two of its new 150-ton open-hearth furnaces at Ecorse, Mich., adjacent to Detroit on the Detroit River. The furnaces are now being warmed up and should be producing steel in the next month. They will be supplied with hot metal from one of the Hanna blast furnaces at Zug Island, about a mile and a half away. The metal will be transported in ladle cars. At first the open-hearts will require only a portion of the output

of the 500-ton blast furnace, but as time progresses it is expected that they will take all of the tonnage. When this latter point is reached, there will be only one blast furnace in the Detroit district making merchant pig iron. The Hanna company is planning to offset the reduction in merchant tonnage locally by increasing the amount of pig iron brought to Detroit by boat from Buffalo.

Sheet mills in this district have been operating the past two weeks at about 60 per cent of capacity. They have been feeling the effects of the reduced output in the automobile industry and have been compelled to run from day to day with little tonnage ahead at any time.

Pig iron is very quiet. Several of the large foundries have scaled down production almost to nothing, but the Chevrolet foundry, on the other hand, is running at an exceptionally good rate compared with the industry. In August it will begin turning out castings for the 1931 Chevrolet.

BOSTON

Pig Iron, Fabricated Structural Steel and Reinforcing Bars More Active

BOSTON, July 29.—Although by no means active, the pig iron market is winding up July in better fashion than was generally anticipated, and the number of melters who are quietly feeling out the market is sufficiently large to indicate that August may be a moderately good month. Massachusetts and Connecticut foundries bought about 4000 tons of iron the past week, or twice as much as during the previous week. With the exception of one 1000-ton lot for a Massachusetts foundry and one 650-ton lot for another, sales were mostly in small tonnages and included 15 or 16 cars for spot shipment. Of the 4000 tons, the Mystic Iron Works sold 2250 tons and Buffalo stacks more than 1500 tons. Buffalo No. 2, No. 2X and No. 1X are available at \$16 a ton, furnace, and furnaces east of Buffalo are meeting this price and occasionally shading it a few cents.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25..	\$20.28
†Buffalo, sil. 2.25 to 2.75..	\$20.28 to 20.78
*Buffalo, sil. 1.75 to 2.25..	20.91
*Buffalo, sil. 2.25 to 2.75..	20.91 to 21.41
Va., sil. 1.75 to 2.25.....	25.21
Va., sil. 2.25 to 2.75.....	25.71
*Ala., sil. 1.75 to 2.25.....	22.61
*Ala., sil. 2.25 to 2.75.....	23.11
†Ala., sil. 1.75 to 2.25.....	18.75
†Ala., sil. 2.25 to 2.75.....	19.25

Freight rates: \$4.91 all rail and \$4.28 rail and water from Buffalo; \$5.21 all rail from Virginia; \$9.61 all rail from Alabama and \$5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

Reinforcing Bars.—Upward of 3200 tons of reinforcing bars were sold here the past week, including 2000 tons for the local Post Office and 650 tons for a subway extension, and 200 tons of rail steel bars for Massachusetts road work. Six bids were made for the subway extension business, which went to Kalman Steel Co., at 2.09c. a lb., delivered in six weeks for

under negotiation. Otherwise, business the past week consisted of car lots of Class B water and gas pipe, the aggregate falling short of 500 tons. The Donaldson Iron Co. took the Braintree business at \$41.60 a ton, delivered, the highest bid made, one foundry's bid of \$1 a ton less having been turned down. Average prices, even on car lots, range from about \$35 a ton up to \$36.80, f.o.b. foundry, on 6-in. and larger pipe.

Fabricated Steel.—Six fabricating jobs involving 1470 tons of steel were let the past week, in addition to a sizable number of small jobs, giving the market more activity than in many weeks. Competition for the Springfield-Ludlow, Mass., bridge, taking 575 tons of steel, was keen, 10 concerns having submitted bids. The Boston Bridge Works, Inc., was low bidder at \$112,444, and the Fuller Construction Co. high at \$136,700. Two Boston jobs are scheduled to come up for figuring in August, one calling for 2000 tons of steel and the other 12,000 to 15,000 tons. The Boston-East Boston vehicular tunnel will not be figured until fall. Its construction will involve the use of a steel tube reinforced with rails.

Old Material.—With the American Steel & Wire Co. out of the market, heavy melting steel prices have softened again. The general top price paid for that material the past week was \$8.80 a ton, on cars shipping point, but some business was put through at as high as \$9 and at as low as \$8.50. The Worcester, Mass., mill is, however, buying small tonnages of long bundled skeleton, for which brokers are paying \$6.10 a ton, on cars. Otherwise, the scrap market is quiet, with prices just about as they were a week ago. More material is moving out of New England than is generally believed, however. Most of the local South Station train shed scrap and material from 30 Ford-made wartime submarine chasers being scrapped here are going to the Bethlehem Steel Co. The owner of the submarine chasers has about 500 tons of very low grade ballast pig iron, for which he can obtain no bid. New England foundries are taking textile and machinery cast a little more freely from local and nearby yards.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel..	\$8.50 to \$9.00
Scrap T rails.....	8.25 to 9.10
Scrap girder rails.....	7.50 to 8.10
No. 1 railroad wrought..	7.00 to 7.50
Machine shop turnings.....	4.00 to 4.35

Cast iron borings (steel works and rolling mill)	4.00 to 4.35
Bundled skeleton, long....	6.00 to 6.75

Forge flashings.....	7.25 to 7.60
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Blast furnace borings and turnings.....	3.10 to 4.10
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Forge scrap.....	6.10 to 6.50
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Shafting.....	13.00 to 14.50
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Steel car axles.....	16.00 to 17.00
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Wrought pipe, 1 in. in diameter (over 2 ft. long)	6.50 to 7.10
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Rails for rolling.....	9.00 to 9.25
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Cast iron borings, chemical	9.00 to 9.25
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Prices per gross ton deliv'd consumers' yards:

Textile cast.....	\$11.50 to \$12.00
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No. 1 machinery cast.....	13.50 to 14.00
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No. 2 machinery cast.....	11.00 to 11.50
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Stove plate.....	8.50 to 9.50
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Railroad malleable.....	16.00 to 16.25
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Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates.....	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees.....	3.365c.
Zees.....	3.465c.
Soft steel bars, small shapes.....	3.265c.
Flats, hot-rolled.....	4.15c.
Reinforcing bars.....	3.265c. to 3.54c.
Iron bars—	
Refined.....	3.265c.
Best refined.....	4.60c.
Norway rounds.....	6.60c.
Norway squares and flats.....	7.10c.
Spring steel—	
Open-hearth.....	5.00c. to 10.00c.
Crucible.....	12.00c.
Tie steel.....	4.50c. to 4.75c.
Bands.....	4.015c. to 5.00c.
Hoop steel.....	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex.....	*3.55c. to 5.55c.
Squares and flats.....	*4.05c. to 7.05c.
Toe cak steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.

Per Cent Off List

Machine bolts.....	50 and 5
Carriage bolts.....	50 and 5
Lag screws.....	50 and 5
Hot-pressed nuts.....	50 and 5
Cold-punched nuts.....	50 and 5
Stove bolts.....	70 and 10

*Including quantity differentials.

ST. LOUIS

Pig Iron and Steel Buying at Low Ebb— Southern Iron Declines

ST. LOUIS, July 29.—Buying of pig iron continues at low ebb. Sales of the St. Louis Gas & Coke Corporation for the week totaled only 1200 tons, and reports were of light sales of Southern iron. There are some inquiries in the market, but no great improvement is expected before the end of August or early in September. Shipments against contracts are said to be holding up well. A reduction in the price of Southern iron is reported, with offerings being made at \$12, f.o.b. Birmingham, 50c. less than the preceding week.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25,	
f.o.b. Granite City, Ill.	\$18.00 to \$18.50
Malleable, f.o.b. Granite City	18.00 to 18.50
N'th'n No. 2 fdy., deliv'd St. Louis	20.16
Southern No. 2 fdy., deliv'd	16.42
Northern malleable, deliv'd	19.66
Northern basic, deliv'd...	19.66

Freight rates: 75c. (average) Granite City to St. Louis: \$2.16 from Chicago; \$4.42 from Birmingham.

Finished Steel.—Demand for plates, shapes and bars is light. Buying of sheets also is small, which is true of all iron and steel goods used chiefly in the country, as a result of the depression in values of farm products. The outlets through the building industry are still limited, the principal demand for reinforcing bars coming from the highway field. Warehouse business is about on a par with last month's trade.

Old Material.—The market for scrap continues weak. Consumers in the district bought very little during the week, and not much buying is expected for the next 30 days, this being regulated by the volume of orders received for finished products. There is said to be very little distress scrap iron. Railroad lists are about the only material that is coming here. Prices generally are unchanged.

Railroad lists: New York Central, 850 tons; Chicago, Milwaukee, St. Paul & Pacific, 160 carloads; Missouri Pacific, 111 carloads; New York, Chicago & St. Louis, 27 carloads; Mo-

bile & Ohio, 23 carloads; Chicago Great Western, 17 carloads; Chicago, Indianapolis & Louisville, 16 carloads; Nashville, Chattanooga & St. Louis, 15 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

Selected heavy melting steel	\$11.00 to \$11.50
No. 1 heavy* melting or shoveling steel	10.75 to 11.25
No. 2 heavy melting or shoveling steel	10.00 to 10.50
No. 1 locomotive tires	13.00 to 13.50
Misc. stand.-sec. rails including frogs, switches and guards, cut apart	11.25 to 11.75

Railroad springs	13.25 to 13.75
Bundled sheets	7.50 to 8.00
No. 2 railroad wrought	10.75 to 11.25
No. 1 busheling	9.00 to 9.50
Cast iron borings and shoveling turnings	8.50 to 9.00
Iron rails	10.00 to 11.00
Rails for rolling	12.00 to 12.50
Machine shop turnings	6.00 to 6.50
Heavy turnings	8.50 to 9.00
Steel car axles	15.50 to 16.00
Iron car axles	24.50 to 25.00
Wrot. iron bars and trans.	14.00 to 14.50
No. 1 railroad wrought	8.00 to 8.50
Steel rails, less than 3 ft.	13.50 to 14.00
Steel angle bars	10.25 to 10.75
Cast iron carwheels	12.00 to 12.50
No. 1 machinery cast	12.00 to 12.50
Railroad malleable	10.50 to 11.00
No. 1 railroad cast	11.00 to 11.50
Stove plate	9.50 to 10.00
Relay, rails, 60 lb. and under	20.50 to 23.50
Relay, rails, 70 lb. and over	26.50 to 29.00
Agricult. malleable	10.00 to 10.50

BIRMINGHAM

Active Blast Furnaces Increased from 12 to 14—Ingot Output Stepped Up

BIRMINGHAM, July 29.—The past two weeks have marked the low point of the year thus far in the pig iron market. Forward contracting is rare despite efforts of furnace interests to encourage it. Shipments during July have averaged below those of June, making the second consecutive month they have been below production. Several important melting units have been down since July 1. Some of these are expected to resume operations in August. Recent curtailment of output by one maker has relieved the situation some so far as furnace stocks are concerned.

Active furnaces have been increased from 12 to 14. The Tennessee company blew in its No. 6 Ensley furnace July 22 on recarburizing iron and on the same date its Ensley No. 4 furnace, which had been banked, was placed on basic iron. Nine furnaces are on foundry iron, four on basic iron and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	\$14.00
No. 1 fdy., 2.25 to 2.75 sil.	14.50
Basic	14.00

Finished Steel.—Order books are slightly better than they were two weeks ago, though buying is conservative and the tonnage booked is light in proportion to the inquiries received. Sheets are being moved on recent orders while new orders develop at a steady rate. Opinions are that active sheet sales will continue through August. Plates for tank work are in more active demand. Bars and shapes about held their own last week. The market for wire products is still sluggish. The price range of \$1 a ton has been removed from quotations on blue annealed sheets and only the minimum figure of 2.15c. is quoted for No. 9 and No. 10 gage. The rail mill at Ensley resumed operations on July 24, but at present there is no assurance of operations continuing beyond the next three or four weeks. Structural steel fabricators have had a light week in new business, but their shop schedules are in fair shape. Car shops re-

port no new business, though they still have work for several weeks. The Tennessee company has five open-hearths in operation at Ensley, an increase of two, and five in operation at Fairfield, an increase of one. The Gulf States Steel Co. continues to work four at Alabama City.

Cast Iron Pipe.—The United States Pipe & Foundry Co. has received an order from Memphis, Tenn., for 50,000 ft. of 10-in. pipe and 50,000 ft. of 6-in. pipe. New orders of the American Cast Iron Pipe Co. include 750 tons for Beaumont, Tex., and 125 tons for Meridian, Miss. The water works project at Hattiesburg, Miss., calling for around 3000 tons of pipe, has been awarded to the Volz Construction Co., Memphis, Tenn. The J. B. McCrary Co., Atlanta, Ga., will buy the 7800 ft. of 14-in. pipe required for the project at Greenville, Miss. Dayton, Ohio, is inquiring on an important tonnage to be let around Aug. 1. Bids are to be opened Aug. 20 on a tonnage at Kenner, La. Carload orders are developing steadily. Pressure pipe makers anticipate a fair average of new business for the next several weeks. Prices are without change from \$37 to \$38 a ton, base, Birmingham.

Old Material.—The only noticeable change in the market last week was the development of a few spot orders for special grades of steel scrap. Larger users are reported taking some scrap from the open market at bargain prices. Dealers' quotations are unchanged.

Prices per gross ton deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	\$12.00
Scrap steel rails	\$12.50 to 13.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	11.50 to 12.00
Steel axles	20.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	14.50
No. 1 cast	13.00
Tramcar wheels	12.50
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem.	13.50 to 14.00

PACIFIC COAST

SAN FRANCISCO, July 28.—(By Air Mail)—Structural steel shapes are the most active steel product on the Pacific Coast. Interest is centered in the new Ford Motor Co. plant at Richmond, Cal., requiring 4400 tons of shapes and 2500 tons of reinforcing steel. The general contract, bids on which were opened June 16, has just been awarded to the Clinton Construction Co., San Francisco. It is expected that the various steel sub-contracts will be placed within the next few days. Steel prices are holding fairly well.

The only awards of reinforcing steel bars in excess of 100 tons went to the Northwest Steel Rolling Mills for a 100-ton firewall in Seattle and to an unnamed interest for 100 tons for a bridge over the Trinity River, Cal. Several fair-sized new inquiries have come into the market, including 2000 tons for the Procter & Gamble Co. plant at Long Beach and 300 tons for a theater in Los Angeles. Out-of-stock prices in the San Francisco district are firm at 2.50c., base, on car-load lots. Merchant bar steel continues to move in small lots only. Prices on this class of material are firm at 2.25c., c.i.f.

The American Potash & Chemical Co., Trono, Cal., placed four steel tanks, involving 375 tons, with the Western Pipe & Steel Co. and the Consolidated Steel Corporation, the former company receiving the bulk of the business. No other awards of importance were reported. Bids have been opened on 2000 tons for a 36 and 42-in. welded steel pipe line for Los Angeles. Prices continue to range from 2.15c., to 2.25c., c.i.f.

Structural awards exceeded 1500 tons. The Minneapolis Steel & Machinery Co. booked 600 tons for a theater on South Broadway, Los Angeles, and the Consolidated Steel Corporation took 550 tons for a theater on the opposite side of the street. The McClinic-Marshall Co. secured 200 tons for a store building at San Rafael, Cal. The Herrick Iron Works was low bidder on the structural steel for the Ford plant at Richmond. New inquiries include 450 tons for an addition to the Bank of Italy, San Francisco. Shapes remain firm at 2.25c., c.i.f.

Other Finished Material.—The usual summer lull is noted in the cast iron pipe market. The American Cast Iron Pipe Co. took 300 tons of various sizes for Seattle. The United

Structural Steel the Most Active Product—Pig Iron Prices Lower

States Pipe & Foundry Co. and the American Cast Iron Pipe Co. were low bidders on 260 tons of 6 and 10-in. and 771 tons of 6 and 8-in. pipe, for San Francisco. Whittier, Cal., will open bids Aug. 4 on 226 tons of 30-in. pipe. On Aug. 11, San Diego will take bids on 301 tons of 4 to 8-in. pipe.

Pig Iron.—Prices on Utah basic and foundry iron, as well as on Indian iron, have been reduced from a range of \$25 to \$26 to \$22 to \$24. Prices

Pig Iron Prices Per Gross Ton at San Francisco	
*Utah basic	\$22.00 to \$24.00
*Utah fdy., sil. 2.75 to 3.25	22.00 to 24.00
**Indian fdy., sil. 2.75 to 3.25	22.00 to 24.00
Delivered San Francisco.	
**Duty paid, f.o.b. cars San Francisco.	

quoted on the former are for delivery at San Francisco and on the latter are c.i.f., duty paid. Demand is not active, most consumers having fair-sized stocks in their yards.

BUFFALO

Pig Iron Trade Slightly Improved, with Sales of 8000 Tons

BUFFALO, July 29.—There seems to be a considerably better sentiment in the pig iron market, with a little more inquiry and a little more business, though few sizable inquiries have made their appearance. A total of about 8000 tons has been sold by Buffalo furnaces. There have been a few sales of 200 to 300-ton lots in the district. One inquiry from the East is for 1000 tons of foundry; another is for 800 to 1000 tons of foundry and malleable and a third for 400 tons of foundry. It is understood that the General Electric Co. has bought some iron on its old inquiry for Eastern plants. Canal shipments are going well, and a healthy indication is that several pig iron shipments have been ordered ahead of schedule.

Prices per gross ton, f.o.b. furnace:
 No. 2 fdy., sil. 1.75 to 2.25.....\$18.50
 No. 2X fdy., sil. 2.25 to 2.75.....19.00
 No. 1 fdy., sil. 2.75 to 3.25.....20.00
 Malleable, sil. up to 2.25.....19.00
 Basic.....17.50
 Lake Superior charcoal.....27.28

Finished Steel.—Operations of Buffalo mills remain about on a par with last week's. The Lackawanna plant of the Bethlehem Steel Co. is operating 16 open-hearths of 24. The Donner plant is operating three and the Wickwire-Spencer Steel Corporation three. No sizable structural tonnage has been placed during the past week, but the award of the general contract for the new Ford Motor Co. plant is expected this week and probably will bring out about 1000 tons of structural steel in addition to the sizable tonnage of reinforcing bars noted last week. Warehouse prices are off \$3 a ton on bars, plates, structural shapes, bands and hoops. Warehouse business is reported fair but somewhat behind that of June.

Old Material.—The market is quiet, though it is reported that one interest has bought a fairly sizable tonnage of heavy melting steel at \$13.25. A small tonnage of stove plate was sold at \$10.40, and a sale of No. 1

machinery cast at \$11 is reported. The market seems to be weaker.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 basic melting steel	\$12.75 to \$13.50
No. 2 heavy melting scrap	11.25 to 11.50
Scrap rails	12.00 to 12.50
Hydraulic comp. sheets	11.25 to 12.25
Hand bundled sheets	9.00 to 9.50
Drop forge flashings	11.25 to 12.25
No. 1 busheling	11.25 to 12.25
Hvy. steel axle turnings	11.00 to 11.50
Machine shop turnings	6.00 to 7.00
No. 1 railroad wrought	10.00 to 10.50

Acid Open-Hearth Grades:	
Knuckles and couplers	15.00 to 15.50
Coil and leaf springs	15.00 to 15.50
Rolled steel wheels	15.00 to 15.50
Low phosph. billet and bloom ends	16.50 to 17.00

Electric Furnace Grades:	
Short shov. steel turnings	10.50 to 10.75

Blast Furnace Grades:	
Short mixed borings and turnings	9.00 to 9.50
Cast iron borings	9.00 to 9.50
No. 2 busheling	7.00

Rolling Mill Grades:	
Steel car axles	16.00 to 16.50
Iron axles	19.00 to 19.50

Cupola Grades:	
No. 1 machinery cast	12.00 to 12.50
Stove plate	10.75 to 11.00
Locomotive grate bars	9.00 to 9.50
Steel rails, 3 ft. and under	16.00 to 16.50
Cast iron car wheels	13.50 to 14.00

Malleable Grades:	
Industrial	15.50 to 16.00
Railroad	15.50 to 16.00
Agricultural	15.50 to 16.00

Special Grades:	
Chemical borings	11.50 to 12.00

A new Pittsburgh warehouse has been opened by the Chase Brass & Copper Co. at 855 North Avenue West, bringing the company's warehouses throughout the United States to a total of 19. A complete stock of brass and copper products will be carried in the new warehouse, which was built and equipped for the purpose.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.25c.
Soft steel bars	3.15c.
Reinforcing bars	2.95c.
Cold-fin. flats and sq.	3.65c.
Rounds and hex.	3.15c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Bands	3.50c.
Hoops	3.90c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	\$3.20
Black wire, base per 100 lb.	3.50c.

Warehouse Prices, f.o.b. San Francisco

Base per Lb.
Plates and struc. shapes
Soft steel bars
Black sheets (No. 24)
Blue ann'l'd sheets (No. 10)
Galv. sheets (No. 24)
Struc. rivets, 1/2-in. and larger
Com. wire nails, base per keg
Cement c't'd nails, 100 lb. keg

CANADA Depression Settles Over Industry in Dominion— Pig Iron Sales at a Minimum

TORONTO, July 29.—The usual summer depression has settled over the Canadian iron and steel market. The larger companies are placing orders for raw materials in a very conservative manner. Pig iron sales are at about their minimum point for the year thus far, and shipments against contracts are decidedly below those for this season last year, and even show a decline from 1928. Local blast furnace representatives say that no future buying is being done. Spot sales have also been affected by the general depression in industry, and it is expected that further curtailment will be made in the melt within the next few weeks. Backlogs are rapidly disappearing. Steel mills and others report business close to the stagnation point. The suspension in buying has also affected pig iron imports. Practically no iron is being shipped from Great Britain, and the United States producers are picking up only odd lots from implement makers. Canadian iron prices are unchanged.

Prices per gross ton:

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75.....	\$22.60
No. 2 fdy., sil. 1.75 to 2.25.....	22.10
Malleable	22.60

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75.....	\$24.00
No. 2 fdy., sil. 1.75 to 2.25.....	23.50
Malleable	24.00
Basic	22.50

Imported Iron, Montreal Warehouse

Summerlee	\$33.50
Carron	33.00

Structural Steel.—While new business is comparatively quiet, sales are being made from time to time, and it is believed that most fabricators will

be able to maintain favorable output for some months. Current buying is mostly in small tonnages for building construction, but some good tonnages are passing to fabricators for bridge construction, especially in Quebec and British Columbia. The Disher Steel Construction Co., Toronto, received contracts during the week involving approximately 3000 tons of steel, one order being for about 2500 tons for a new building at Queen's University, Kingston, and the other for 500 tons for the Consumers Gas Building in Toronto.

Old Material.—With consumption at a low level, scrap users are adhering strictly to conservative buying methods. While mills are taking in supplies against old contracts, only small tonnages were booked from this source during the week. Dealers have practically withdrawn from the market and what purchases are being made are for direct shipment to consumers. Quotations are unchanged.

Dealers' buying prices for old material:

Per Gross Ton

	Toronto	Montreal
Heavy melting steel.....	\$9.00	\$8.00
Rails, scrap	10.00	8.00
No. 1 wrought	9.00	11.00
Machine shop turnings	6.00	5.00
Boiler plate	7.00	6.50
Heavy axle turnings	7.00	6.00
Cast borings	6.50	5.00
Steel borings	6.50	6.00
Wrought pipe	4.00	4.00
Steel axles	10.00	13.00
Axes, wrought iron.....	12.00	15.00
No. 1 machinery cast .....	...	12.00
Stove plate .....	...	10.00
Standard carwheels	10.50	...
Malleable	10.00	...

Per Net Ton

No. 1 mach'ry cast.....	11.00	...
Stove plate	9.00	...
Standard carwheels	10.00	...
Malleable scrap	9.00	...

coke will be \$9 a ton, delivered, Cincinnati.

Warehouse Business.—Demand for warehouse products is markedly off. District jobbers have reduced prices on plates, shapes, bars, hoops, bands, and floor plates about \$3 a ton. This is the first sharp reduction of prices since 1924 according to local jobbers.

Finished Steel.—With the demand from all fields, except road construction, very slow, new business of district sheet mills was approximately 35 per cent of capacity last week. Since mills are depending on current bookings to sustain operations, production is about on a par with demand. Consumers fail to show any interest by way of inquiry. As inventories of consumers are very low, it is expected that a turn in the market will result in a sharp gain in bookings.

Old Material.—The district scrap market is quiet. Consumers are taking some scrap on contract, but new business is negligible. Dealers are buying only as the occasion of immediate turnover arises. The Norfolk & Western Railroad is offering a list of about 2800 tons.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$11.25 to \$11.75
Scrap rails for melting	11.75 to 12.25
Loose sheet clippings	8.00 to 8.50
Bundled sheets	10.00 to 10.50
Cast iron borings	8.00 to 8.50
Machine shop turnings	7.50 to 8.00
No. 1 busheling	9.50 to 10.00
No. 2 busheling	6.00 to 6.50
Rails for rolling	13.00 to 13.50
No. 1 locomotive tires	13.50 to 14.00
No. 2 railroad wrought	11.25 to 11.75
Short rails	17.00 to 17.50
Cast iron carwheels	12.00 to 12.50
No. 1 machinery cast	17.50 to 18.00
No. 1 railroad cast	14.50 to 15.00
Burnt cast	8.25 to 8.75
Stove plate	8.25 to 8.75
Brake shoes	8.25 to 8.75
Agricultural malleable	14.00 to 14.50
Railroad malleable	15.00 to 15.50

CINCINNATI By-Product Coke Price Reduced—Sheet Sales 35 Per Cent of Capacity

CINCINNATI, July 29.—The district pig iron market is dull and featureless. Furnace representatives point to the present low inventories of consumers as the only bright spot in the market, and they feel that when material is needed the uptrend will be sharp.

Last week's sales totaled 2100 tons,

of which only about 400 tons, in small lots, was Southern iron. This iron is still very weak in demand, despite the present attractive quotation of \$12.50, base Birmingham. While reports of lower prices on Northern iron have been circulating, no announcement of reductions has been made, but some concessions in silicon differentials have been given on quantity orders.

A Hamilton, Ohio, buyer took 500 tons of Northern foundry iron and a Cincinnati consumer bought 100 tons. There is no pending business of size.

Prices per gross ton, deliv'd Cincinnati:
So. Ohio fdy., sil. 1.75 to 2.25..... \$20.89 to \$21.39
Ala. fdy., sil. 1.75 to 2.25..... 16.19 to 17.69
Ala. fdy., sil. 2.25 to 2.75..... 17.19 to 18.19
Tenn. fdy., sil. 1.75 to 2.25..... 17.19 to 17.69
S'th'n Ohio silvery, 8 per cent

26.89

Freight rates. \$1.89 from Ironton and Jackson, Ohio; \$2.69 from Birmingham.

Warehouse Prices, f.o.b. Cincinnati	
Base per Lb.	
Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
New billet reinforce. bars.....	3.15c.
Rail steel reinforce. bars.....	3.00c.
Hoops	3.90c.
Bands	3.25c.
Cold-fin. rounds and hex.....	3.80c.
Squares	4.30c.
Black sheets (No. 24).....	4.05c.
Galvanized sheets (No. 24).....	4.90c.
Blue ann'd sheets (No. 10).....	3.45c.
Structural rivets	4.20c.
Small rivets	60 per cent off list
No. 9 ann'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg (25 kegs or more)	2.95
Cement c't'd nails, base 100 lb. keg	2.95
Chain, per 100 lb.....	10.25
Net per 100 Ft.	
Lap-welded steel boiler tubes, 2-in.....	\$16.50
4-in.....	34.50
Seamless steel boiler tubes, 2-in.....	17.50
4-in.....	36.00

Coke.—With demand for foundry grades of coke sharply off and specifications slow, by-product ovens have announced a reduction in price. Beginning Aug. 1, by-product foundry

Youngstown

Two Blast Furnaces Suspend Operations

YOUNGSTOWN, July 29.—Two blast furnace suspensions mark changes in this week's operating schedules of Mahoning Valley iron and steel properties. Anna blast furnace, operated by the Struthers Furnace Co., has been blown out for relining and other repairs after 22 months of continuous operation. The management is taking advantage of the current lull in merchant iron buying to improve the stack, which will be down for at least six weeks. The Carnegie Steel Co. has likewise suspended another stack in its Ohio Works group, leaving three of six furnaces comprising this complement in blast.

Steel plant operations continue with little change in this district, with from 27 to 28 open-hearth furnaces operating and Bessemer steel departments at 60 per cent.

The Republic Steel Corporation, the Youngstown Sheet & Tube Co. and the Carnegie Steel Co. are averaging from 55 to 60 per cent.

Non-Ferrous Metal Markets

Copper Sales Very Large— Zinc Advancing

NEW YORK, July 29.

Copper.—With the price down to the lowest point in 28 years, buying of copper has been very large, particularly during the past week. Total sales for the month to date are estimated at about 400,000,000 lb., of which about 125,000,000 lb., or over 30 per cent, was for export. Recognizing that copper is a bargain, consumers have been buying very liberally. Sales by some companies have been for delivery throughout the rest of the year but most producers have not sold beyond October, to domestic consumers. Even now two or three companies are out of the market at the present price. Sales to foreign consumers have been as far ahead as October arrivals and the sales have been heavy each day.

Though there has been some talk here and there of lower prices, there is little indication of any change except an advance. There is some difference of opinion among producers as to the advisability of an increase at this time, but there is persistent talk of an advance in the export price from 11.30c. to at least 11.55c. in the near future. There is no question but that consumers have bought more metal than their order books call for and some argue that a price increase would be a tonic.

Quotations are very firm, at 11c., delivered in the Connecticut Valley for electrolytic copper, with Lake copper at 11c. to 11.12½c., delivered. Opinion prevails that the July statistics will show a reduction in blister stocks of copper but an increase in refined metal.

Tin.—A fair business has been done during the week, totaling probably about 1000 tons. Most of it was for nearby delivery, with some sales for October-November-December. This moderate spurt in buying is attributed to a generally better sentiment and to the present low values. Stocks of metal in London warehouses for the week ended Saturday, July 26, amounted to 23,211 tons, an increase of 491 tons, and a new high record. Estimates made early in the month that shipments from the Straits in July would total 8500 tons are not likely to be realized because the carryover in the East will probably be large. Spot Straits tin today is quoted at 29.87½c., New York. In London today spot standard was quoted at £134 15s., future standard at £136 7s. 6d. and spot Straits at

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	July 29	July 28	July 26	July 25	July 24	July 23
Lake copper, New York.....	11.12½	11.12½	11.12½	11.12½	11.12½	11.12½
Electrolytic copper, N. Y.*.....	10.75	10.75	10.75	10.75	10.75	10.75
Straits tin, spot, N. Y.	29.87½	30.12½	...	29.87½	29.75	29.70
Zinc, East St. Louis.....	4.75	4.75	4.65	4.50	4.45	4.40
Zinc, New York.....	5.10	5.10	5.00	4.85	4.80	4.75
Lead, East St. Louis.....	5.15	5.15	5.15	5.15	5.15	5.15
Lead, New York.....	5.25	5.25	5.25	5.25	5.25	5.25

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

£136. The Singapore price was £138 15s.

Lead.—Demand is not quite so active as it was last week, but the market is very steady. Most of the buying now is by smaller users for prompt and August shipment. It is estimated that August bookings thus far have been about 65 per cent of the calculated requirements of consumers for that month. Buying is confined to carload and small lots at prices which have remained unchanged for several weeks, or 5.15c., St. Louis, and 5.25c., New York.

Zinc.—Advances which have been under way in prime Western zinc have continued, and sales have been made yesterday and today at 4.75c., East St. Louis, or 5.10c., New York, a new high for the movement. Total sales for the month will bulk fairly large. Despite the fact that stocks are still quite large, the advance is due partly to the fact that certain producers,

anxious to sell, have disposed of such metal and also because consumers, realizing that an increase in price was in order, have been more anxious to purchase.

Accompanying the rise in slab zinc, prices for the ore have also advanced and sales were made last week from \$29 to \$33.50, Joplin. Only about 1640 tons, however, was sold. With output in the tri-state district at 8500 tons and shipments at 6787 tons, the surplus is estimated at 28,414 tons. With stocks of the metal in strong hands and with the ore position firm, the tone of the market is naturally strong.

Antimony.—Because of the activities of the Reds in China and the possibility of some interference with shipments of the metal, the market is stronger at 7.12½c., New York, duty paid, for all positions. Consumer buying has been fairly large, with about 150 tons changing hands.

Nickel.—The same prices which

New York, Chicago or Cleveland Warehouse

Delivered Prices. Base per Lb.

High brass	17.75c.
Copper, hot rolled, base sizes.....	20.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes.....	23.00c.
Seamless Tubes—	
Brass	22.75c.
Copper	23.00c.
Brass Rods	16.12½c.
Brazed Brass Tubes.....	25.37½c.

New York Warehouse

Delivered Prices. Base per Lb.

Zinc sheets (No. 9),	
casks	9.75c. to 10.25c.
sheets, open.....	10.75c. to 11.25c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig.....	35.00c.
Tin, bar	37.00c.
Copper, Lake	12.25c.
Copper, electrolytic	12.25c.
Copper, casting	11.75c.
Zinc, slab	5.75c. to 6.00c.
Lead, American pig.....	6.00c. to 6.25c.
Lead, bar	8.75c.
Antimony, Asiatic	12.50c.
Babbitt metal, medium grade.....	17.50c.
Babbitt metal, high grade	38.00c.
Solder, ½ and ½	21.75c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses.

Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	9.00c. 10.00c.
Copper, hvy. and wire	8.75c. 9.75c.
Copper, light and bot-	
toms	7.50c. 8.50c.
Brass, heavy	5.00c. 6.25c.
Brass, light	4.50c. 5.75c.
Hvy. machine compo-	
sition	7.75c. 8.75c.
No. 1 yel. brass turn-	
ings	5.50c. 6.50c.
No. 1 red brass or	
compos. turnings	7.00c. 8.00c.
Lead, heavy	3.75c. 4.25c.
Lead, tea	2.50c. 3.25c.
Zinc	2.00c. 2.50c.
Sheet aluminum	7.50c. 9.50c.
Cast aluminum	7.00c. 9.00c.

have prevailed so long continue. In wholesale lots ingot metal is quoted at 35c. a lb., shot nickel at 36c., and electrolytic nickel in cathodes, 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is unchanged at the published price of 22.90c. a lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, July 29.—Sales in this market are steady but in small volume. Quotations for copper are steady while prices for tin, zinc and antimony are advanced. The old

metal market is without change either as to prices or consumer interest.

Prices per lb., in carload lots: Lake copper, 11.125c. to 11.25c.; tin, 30.70c.; lead, 5.25c.; zinc, 4.85c.; in less-than-carload lots, antimony, 8.35c. On old metals we quote copper wire, crucible shapes and copper clips, 9c.; copper bottoms, 7.25c. to 7.75c.; red brass, 7.25c. to 7.75c.; yellow brass, 5c. to 5.50c.; lead pipe, 3.75c.; zinc, 1.50c. to 1.75c.; pewter, No. 1, 15c.; tin-foil, 17.50c.; block tin, 22.50c.; aluminum, 7c. to 7.50c.; all being dealers' prices for less-than-carload lots.

C. M. Schwab's Salary and Bonus to Be Probed

YOUNGSTOWN, July 29.—Attorneys for Cyrus S. Eaton, fighting to prevent the Youngstown Sheet & Tube-Bethlehem Steel merger, announced this evening they have asked Bethlehem representatives to advise the court what salary or bonus is paid Charles M. Schwab, chairman of the Bethlehem board. Another witness will also be called to further testify regarding bonus payments to various officials. Total payments last year, President Eugene G. Grace has testified, were \$3,425,306, of which he received \$1,623,753, with the balance divided among 12 to 15 executives.

Reinforcing Steel

Awards of 4500 Tons—New Jobs Will Take 3650 Tons

INCLUDING 2000 tons for a Post Office in Boston, the largest award reported for the week, total lettings amounted to 4500 tons. Contracts in July totaled 25,600 tons compared with 20,950 tons in June and 43,150 tons in May. New jobs call for 3650 tons and include 2000 tons for a plant at Long Beach, Cal., for Procter & Gamble Co. on which bids are being taken. Awards follow:

BOSTON, 2000 tons, Post Office, to McClinic-Marshall Co.

BOSTON, 650 tons, subway extension, to Kalman Steel Co., Inc.

WOODS HOLE, MASS., 100 tons, Government building, to George B. H. Macomber Co.

ATTLEBORO, MASS., 200 tons, road work, to Northern Steel Co.

QUEENS, NEW YORK, 575 tons, subway route 108, section 8, Slattery Daino Co., New York, general contractor; 300 tons placed with National Bridge Works and 275 tons awarded to Concrete Steel Co.

NEW YORK, 160 tons, subway section 106, route 7, DiMarco & Reimann, general contractors; placed with McClinic-Marshall Co.

RYE, N. Y., 100 tons, high school, to Truscon Steel Co.

CHESTER, PA., 400 tons building for Chester Times.

POTTSVILLE, PA., 500 tons, gymnasium and memorial building for Hill School.

PHILADELPHIA, 4000 tons, bridge at Market Street and tunnel under river.

BERMUDA, 300 tons, Castle Harbor Hotel, to an unnamed company.

CLEVELAND, 1200 tons, piers for Lorain Central Bridge, to Republic Steel Corporation.

SEATTLE, 100 tons, fire wall, to Northwest Steel Rolling Mills.

SACRAMENTO, 100 tons, bridge over Trinity River in Trinity County, to an unnamed bidder.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

CLEVELAND, 700 tons, Brecksville Road bridge for Ohio State Highway Department; bids taken.

LOS ANGELES, 420 tons, Sixth Street viaduct; general contract to Robert E. McKee.

LONG BEACH, CAL., 2000 tons, plant for Procter & Gamble; bids being taken.

LOS ANGELES, 300 tons, theater; bids being taken.

SACRAMENTO, 277 tons, bridge over San Gabriel River, Los Angeles County; bids Aug. 13.

Less Babbitt Consumed

Total apparent consumption of Babbitt metal in June was 3,702,989 lb., compared with 3,932,501 lb. in May, and 5,927,907 lb. in June, 1929, according to reports received by the Department of Commerce. In the first six months the total apparent consumption was 24,390,504 lb., against 35,732,172 lb. in the like period last year.

Simplified Solid-Section Steel Windows

Simplified practice recommendation No. 72—Solid-Section Steel Windows, revised, may now be considered in effect, according to the Division of Simplified Practice, Bureau of Standards, Department of Commerce. The division has received a sufficient number of signed acceptances from manufacturers, distributors and users of steel windows to insure the general adoption of the program by the industry as a whole.

The most important changes made in this revised program are the substitution of nomenclature of commodity products in lieu of dealer stock; the addition of several sizes in both the pivoted and projected window groupings, and changes of types and eliminations in projected architectural windows.

Railroad Equipment

Illinois Steel Co. is inquiring for 95 ingot cars.

Canadian Pacific has ordered 10 switching engines from Canadian Locomotive Co.

Reading has ordered 10 locomotive tenders from Baldwin Locomotive Works.

Erie has ordered seven coaches from Pullman Car & Mfg. Corporation.

Shipments and Orders of Fabricated Sheet Steel Products

	June, 1930	May, 1930	June, 1929
Steel furniture, new orders (a).....	\$2,005,940(b)	\$2,310,398	\$2,553,233
do. do. six months.....	14,723,884	17,408,285	
do. shipments	2,123,441	2,342,097	2,544,039
do. do. six months.....	15,059,529	17,186,825	
do. unfilled orders	1,264,939	1,651,456	2,324,802
do. do.	638,928	725,243	958,866
Steel shelving, new orders (a).....	4,543,096	.....	6,329,949
do. do. six months.....	705,041	751,521	920,355
do. shipments	745,881	753,976	934,129
do. unfilled orders	651,559(c)	731,087	774,853
Steel barrels, production (a), number.....	4,293,366(d)	.....	4,251,024
do. do. six months.....	638,358	736,147	779,567
do. shipments	4,284,017(d)	.....	4,244,967
do. do. six months.....	1,290,412	1,454,601	1,548,999
do. unfilled orders			

(a) United States Department of Commerce. (b) Smallest since August, 1925. (c) Smallest since last February. (d) Largest ever recorded for the period.

Industrial Plants Corporation, 25 Church Street, New York, will sell at public auction beginning Tuesday, Aug. 12, at 10 a. m., the entire stock of machinery and equipment of the Vonnegut Machinery Co., 19 West South Street, Indianapolis, which recently went into bankruptcy.

Despatch Oven Co., Minneapolis, Minn., has reorganized its Chicago office and has made W. S. Appleton district sales representative, who, in conjunction with J. H. Hopp, will handle industrial oven sales in the Chicago territory.

Fabricated Structural Steel

New Projects of 51,000 Tons Include 15,000 Tons for Cincinnati Terminal—Awards Below Average Week

NEW fabricated steel projects reached a total of about 51,000 tons, more than double those of the previous week, bringing the weekly average for the year to 33,000 tons. Included in the total is 8500 tons for two office buildings in New York, 15,000 tons in an additional unit for the Cincinnati Union Terminal Co. and 4000 tons for a bridge in Philadelphia.

Awards totaled only about 32,000 tons, slightly below the average week this year of 33,000 tons. The largest award was 13,000 tons for a telephone building at Walker and Lispenard Streets, New York. An addition to a power plant at Hammond, Ind., took 5000 tons and State highway bridges in Illinois, New Jersey, Connecticut and New York required a total of 2290 tons. Awards follow:

North Atlantic States

SPRINGFIELD-LUDLOW, MASS., 575 tons, bridge, to Boston Bridge Works, Inc.
LAWRENCE, MASS., 250 tons, theater, to New England Structural Co.
BROOKLINE, MASS., 189 tons, bank, to New England Structural Co.
BOSTON, 170 tons, apartment building, to Boston Bridge Works, Inc.
PORTSMOUTH, N. H., 156 tons, junior high school, to New England Structural Co.
BOSTON & MAINE RAILROAD, 128 tons, five bridges, to Boston Bridge Works, Inc.
STATE OF CONNECTICUT, 290 tons, highway bridge, to American Bridge Co.
NEW YORK, 13,000 tons, telephone building at Walker and Lispenard Streets, to A. E. Norton, Inc.
NEW YORK, 225 tons, addition to 60 Broadway, to American Bridge Co.
STATE OF NEW YORK, 250 tons, highway bridges, to American Bridge Co.
STATE OF PENNSYLVANIA, 115 tons, truss span for highway bridge between Juniata and Snyder counties, to American Bridge Co.
STATE OF NEW JERSEY, 150 tons, highway bridges, to Phoenix Bridge Co.
GIRARD, PA., 125 tons, building for Girard Model Works, to Erie Steel Construction Co.
MONESSEN, PA., 230 tons, sintering plant for Pittsburgh Steel Co., to McClintic-Marshall Co.
PITTSBURGH, 600 tons, machine shop for W. E. Moore & Co., to McClintic-Marshall Co.

The South

NOVAK, VA., 400 tons, building for Virginia Electric Light Co., to Virginia Bridge & Iron Co.
AMARILLO, TEX., 450 tons, pier steel for Santa Fe, to an unnamed bidder.

Central States

GRANDVILLE, MICH., 600 tons, highway bridge, to Massillon Bridge & Structural Co.
TRENTON, MICH., 1600 tons, bridge across Detroit River, to Duffin Iron Co.
HAMMOND, IND., 5000 tons, addition to Stateline Generating Co.'s power plant, to McClintic-Marshall Co.
CINCINNATI, 365 tons, Cincinnati Union Terminal Co., to American Bridge Co.
DELAWARE, OHIO, 240 tons, Stuyvesant Hall for Ohio Wesleyan University, to Reliance Structural Steel Co.
STATE OF ILLINOIS, 1600 tons, highway bridges, to unnamed bidders.
URBANA, ILL., 500 tons, women's gymnasium at University of Illinois, to Mississippi Valley Structural Steel Co.

Western States

NIOBRAVA, NEB., 1500 tons, bridge across Missouri River, to American Bridge Co.
LOS ANGELES, 600 tons, theater, to Minneapolis Steel & Machinery Co.
LOS ANGELES, 550 tons, theater, to Consolidated Steel Corporation.
SAN RAFAEL, CAL., 200 tons, store on Fourth Street, to McClintic-Marshall Co.
SACRAMENTO, 167 tons, State bridge over Trinity River, to Pacific Coast Engineering Co.
TRONO, CAL., 375 tons, plates, four tanks for American Potash & Chemical Co., to Western Pipe & Steel Co. and Consolidated Steel Corporation.
HONOLULU, 300 tons, Kress store to Consolidated Steel Corporation.

STRUCTURAL PROJECTS PENDING

Inquiries for fabricated steel work include the following:

North Atlantic States

BOSTON, 209 tons, Roxbury district Children's Hospital unit.
SOMERVILLE, MASS., 160 tons, high school.
EVERETT, MASS., 150 tons, Merrimac Chemical Co. acid plant.
CAMBRIDGE, MASS., 2000 tons, dormitory for Harvard University.
NEW YORK, 875 tons, public schools, No. 98 at Douglaston, L. I., 475 tons, and No. 124 in Richmond Hill, 400 tons.
NEW YORK, 300 tons, loft building at Thirtieth Street and Broadway.
NEW YORK, 3000 tons, office building at Third Avenue and Forty-third Street.
NEW YORK 1000 tons, Juilliard School of Music, 122nd Street and Broadway.

Central States

FLINT, MICH., 1000 tons, Post Office.
CHICAGO, 3000 tons, senior high school.
STILLWATER, MINN., 845 tons, interstate bridge to Houlton, Wis.; Peppard & Fulton Co., Minneapolis, low bidder.
CINCINNATI, 15,000 tons, additional unit for Cincinnati Union Terminal Co.
TOLEDO, 1700 tons, Toledo Art Museum.
CLEVELAND, 500 tons, building for Cleveland Clinic.
AKRON, OHIO, 200 tons, addition to North High School.

Western States

STATE OF SOUTH DAKOTA, 700 tons, highway bridge.
LOS ANGELES, 2000 tons, plates, welded steel pipe; bids opened.
RICHMOND, CAL., 4400 tons, Ford plant; Herrick Iron Works, low bidder on steel frame.
SAN FRANCISCO, 450 tons, addition to Bank of Italy; bids being taken.

Commercial Steel Castings Made and Sold

	(Net Tons)		
	June, 1930	May, 1930	June, 1929
Production, total.....	91,108(a)	105,242	116,221
do., do., per cent of capacity.	63	73	80
do., six months.....	638,183(b)	43,341	669,495
do., railroad items.....	32,793(a)	43,341	54,154
do., six months.....	262,354(b)	.....	291,781
do., miscellaneous.....	58,345(c)	61,901	62,067
do., six months.....	375,859(b)	.....	379,714
New orders, total.....	61,516(d)	91,307	95,201
do., do., per cent of capacity.	43	63	65
do., six months.....	585,136	.....	723,939
do., railroad items.....	13,714(e)	42,051	34,947
do., miscellaneous.....	47,802(f)	49,256	60,254

From United States Department of Commerce.

(a) Smallest since December, 1928.

(b) Largest, except for 1929, ever recorded.

(c) Smallest since February, 1929.

(d) Smallest since October, 1927.

(e) Smallest since 1921.

(f) Smallest since September, 1928.

Machinery Markets and News of the Works

Dullness Still Prevalent

Machine Tool Sales in July at Low Point and Situation Still Lacks Signs of Improvement

MACHINE tool centers still report extreme dullness, with little or no prospect of an early improvement. Not only have July sales been at the lowest point in years, but there is not much indication that August will be better.

Some of the large users of machine tools are showing an interest in new tools for replacement, and in a number of instances such plants are going over their equipment carefully to ascertain what their needs will be when business gets better, but there is little disposition to buy until the actual turn has come.

The large amount of used equipment that has recently been put on the market through auction sales has tended to restrict further the purchase of new tools.

New York

NEW YORK, July 29.—Although buying of machine tools has shown no improvement this month, the trade hears reports of better business in isolated instances among companies which buy machinery, and the outlook is believed to be more favorable for at least a moderate gain in business by September.

Among the larger companies in this district, which are very busy, are the Worthington Pump & Machinery Corporation and the Foster Wheeler Corporation. The General Electric Co. is said to be making plans for increased production at several of its plants. The announcement by the president of the R. C. A.-Victor Co., Camden, N. J., that it will take on 7000 additional workers, increasing its force to 20,000 by Aug. 1, was one of the bright spots of the week and indicated there may be general improvement in the radio industry during the coming months. A small plant which is operating night and day is the Ball & Roller Bearings Co., Danbury, Conn., which has bought two grinding machines.

New York Central Railroad Co., 466 Lexington Avenue, New York, has taken out permit for ten-story automobile service, repair and garage building, 267 x 460 ft., to cost over \$1,200,000 with equipment. O. H. Merritt is company architect.

Meanwhile, machine tool plants are operating at not more than 50 per cent of capacity, and in some instances further curtailment may occur in August unless business should prove to be better next month than is now expected.

The machine tool industry has been watching closely the developments in the investigation of the Amtorg Trading Corporation for alleged communistic propaganda and the action taken at Washington in placing an embargo on imports of paper pulpwood from Russia. A good many machine tool builders have sold the Amtorg on credit terms, but there is said to be a tendency at present to insist upon cash payments, a factor which may tend to divert some of the Amtorg's pending orders to Germany.

Board of Education, Yonkers, N. Y., plans installation of manual training equipment in new three-story high school in Lower Park Hill section, to cost \$1,500,000, for which plans will be drawn by G. H. Chamberlin and A. Fairbrook, 18 South Broadway, architects.

United States Rubber Co., Broadway and Fifty-eighth Street, New York, will concentrate production of mechanical rubber goods at plant at Passaic, N. J., where work is nearing completion on six-story addition, 100 x 175 ft., to cost about \$1,000,000. Plant at Chicago heretofore devoted to such output is being dismantled and machinery will be transferred to Passaic. Similar mills at Cleveland, and Chelsea, Mass., also, will be removed to same location, and offices of mechanical rubber goods division will be transferred from New York to Passaic.

Radio Corporation of America, Woolworth Building, New York, is planning extensions in transmitting station at Bound Brook, N. J., including installation of new generators and power equipment, interlocking switches and other mechanical apparatus. Company has also applied for permission to install an experimental television transmitting station.

National Slicing Machines, Inc., Troy, N. Y., care of Adolph W. Meyer, 10 McArdele Avenue, Albany, N. Y., recently formed by Mr. Meyer and associates with capital of \$103,750, plans operation of local plant for manufacture of slicing

machines and parts, and other kindred products. William J. Drucker, 930 Hinman Avenue, Evanston, Ill., is interested in new company.

Beech-Nut Packing Co., Canajoharie, N. Y., food products, has leased building to be erected at 217-21 West Nineteenth Street, New York, 75 x 200 ft., by Standard Concrete-Steel Co., 250 Eighth Avenue, for factory branch, storage and distributing plant. Project will include a service, repair and garage unit for company trucks and cars, and will cost over \$100,000.

Royal Refrigerating Co., 131-57 North Fourteenth Street, Brooklyn, plans rebuilding part of plant destroyed by fire July 23, with loss of about \$50,000, including machinery.

Drumchrome Corporation, care of William L. Finne, 1201 East Grand Street, Elizabeth, N. J., architect, manufacturer of chrome steel specialties, has plans for new one and two-story plant at Rahway, N. J., to cost over \$40,000 with equipment.

J. B. Acocella, 9 Clinton Street, Newark, architect, has plans for a two-story automobile service, repair and garage building, 100 x 140 ft., to cost over \$120,000 with equipment.

Wallace & Tiernan Co., Inc., 11 Mill Street, Belleville, N. J., manufacturer of chlorine control equipment, water sterilization apparatus, etc., has awarded general contract to Mahony-Trost Construction Co., 657 Main Avenue, Passaic, N. J., for a four-story addition, 77 x 169 ft., to cost more than \$150,000 with machinery. Fletcher-Thompson, Inc., 542 Fairfield Avenue, Bridgeport, Conn., and 31 Fulton Street, Newark, is architect and engineer.

East Rutherford Syringe Co., 75 Mozart Street, East Rutherford, N. J., manufacturer of spraying apparatus, etc., has plans for two-story and basement addition, 30 x 70 ft., to cost about \$25,000 with equipment. Thomas Camlet, 26 Piaget Avenue, Clifton, N. J., is architect and engineer.

American Case Co., 677 Springfield Avenue, Newark, manufacturer of cases for musical instruments, etc., has leased space in three-story factory at 436 Tompkins Street, Orange, N. J., for expansion.

Wilson Welder & Metals Co., Inc., has moved from Hoboken to North Bergen, N. J.

New England

BOSTON, July 28.—The feeling of optimism which prevailed in this market last week continues, although there is a lack of real orders. New tool dealers are of the opinion that the first recovery in business will come from Connecticut, as indications of industrial activity in that State are visible. A few

encouraging signs include the Segal Lock Co., South Norwalk, Conn., which is operating all departments four nights a week in addition to the regular day schedule; Standard Safety Razor Co., South Norwalk, operating a day and night shift and taking on extra help; Ball & Roller Bearing Co., Danbury, Conn., also on a day and night shift and vacation period extended until late in August and possibly later; various Hartford industries operating full time owing to the activities of an airplane engine manufacturing plant in that city; Perkins Machine & Gear Co., West Springfield, Mass., operating on a five day week and night shift and preparing for greater production; increased bookings by an East Boston metal-working plant, and a general survey of New England plants by managements because of intimations of an influx of orders about the middle of August or early in September.

A slight increase is noted in demand for small tools.

New England Fuel & Transportation Co., Everett, Mass., will start work soon on a benzol manufacturing plant. Miscellaneous equipment is under negotiation.

Keyes Fibre Co., Waterville, Me., has plans for an addition for which miscellaneous equipment will be required.

Moore Special Tool Co., Bridgeport, Conn., is asking bids on a one-story and basement addition, 35 x 70 ft.

Maine Steel Products Co., South Portland, Me., is about to start work on a one-story addition, 48 x 90 ft.

Miscellaneous equipment of James Grinding Process Co., Waltham, Mass., was sold at public auction Friday, July 25. Low prices prevailed.

Plant formerly operated by Davis & Farnum Iron Foundry, Waltham, Mass., recently destroyed by fire, according to present plans, will not be rebuilt. It is planned to sell equipment that can be salvaged.

John W. Witherall Co., Newport, R. I., will start work soon on a one-story plant, 74 x 90 ft. Miscellaneous mechanical and electrical equipment will be bought.

Universal Winding Co., Auburn, R. I., manufacturer of textile machinery and parts, has awarded general contract to Bowerman Brothers, 70 Bath Street, Providence, R. I., for a three-story addition, 60 x 160 ft., to cost over \$100,000 with equipment. Headquarters of company are at 95 South Street, Boston.

Eastern Massachusetts Electric Co., Washington Street, Salem, Mass., has applied for permission to issue additional stock, totaling about \$1,193,600, part of fund to be used for extensions and improvements in power plants and system. Company has plans for a new steam-operated electric generating plant at Salem to cost about \$15,000,000 with transmission system. Engineering department of Charles H. Tenney & Co., 38 Chauncy Street, Boston, is in charge.

Malden Electric Co., Malden, Mass., has acquired local property as site for new two-story equipment storage and distributing plant with repair department, laboratory and other divisions, to cost over \$75,000 with equipment.

Rising Paper Co., Housatonic, Mass., is considering plans for a three-story mill at Great Barrington, Mass., to cost about \$100,000 with machinery. L. R. Howes, engineer for Strathmore Paper Co., Moline, Mass., is in charge.

Edison Electric Illuminating Co., 39 Boylston Street, Boston, will carry out

Chestnut Streets, is architect and engineer.

Kalman Steel Co., 1713 Sansom Street, Philadelphia, manufacturer of steel specialties, wire shapes, etc., with main offices at Chicago, has taken title to one-story factory on G Street, on site 121 x 304 ft., heretofore occupied under lease, for permanent Eastern factory branch and distributing plant.

De Laval Steam Turbine Co., North Clinton Avenue and Pennsylvania Railroad, Trenton, N. J., manufacturer of power units, pumping machinery, etc., will soon proceed with superstructure for a one-story addition, for which general contract has been let to John W. Ferguson Co., Paterson, N. J., to cost over \$40,000 with equipment.

New Jersey Steel Co., Camden, N. J., has leased ground floor in industrial building at 1210 South Second Street, totaling 12,000 sq. ft. floor space, and will occupy for local works.

Effective Aug. 15, Fleetwood Body Corporation, manufacturer of custom automobile bodies, a subsidiary of Fisher Body Corporation, Detroit, will discontinue operations at plant at Franklin and Locust Streets, Fleetwood, Pa., and property will be placed on market. Production is being transferred to a new factory unit of parent organization at Detroit, where increased output will be arranged for bodies for Cadillac automobiles.

Factory of John V. Patterson, Annandale, N. J., manufacturer of automatic automobile gear shifts, etc., will be offered at a public sale Aug. 4 at Court House, Flemington, N. J.

E. I. du Pont de Nemours & Co., du Pont Building, Wilmington, Del., has disposed of a new stock issue totaling \$28,565,680, a considerable part of fund to be used for financing an expansion program for subsidiaries. Work will include extensions and improvements in local shops used for production of specialized machinery and parts; additions in plant of du Pont Ammonia Co., Belle, W. Va.; new cellophane plant for du Pont Cellophane Co., at Amphi Hill, near Richmond, Va., and for additional units of mill of same company at Old Hickory, Tenn., to double present output of special wrapping materials, and expansion in plant of Viscocloid Co., Leominster, Mass. Large part of program was authorized late last year and will carry through into 1931.

Philadelphia

PHILADELPHIA, July 28.—Sharp & Dohme, Inc., Broad and Wallace Streets, Philadelphia, has awarded general contract to Day & Zimmermann Engineering & Construction Co., 112 North Broad Street, for five-story addition to chemical plant, with power house, to cost about \$200,000 with equipment.

City Council, Philadelphia, has taken title to Hog Island Shipyard, recently purchased from United States Shipping Board for \$3,000,000, totaling 946 acres, of which about 307 acres will be used for a municipal airport. Plans will be prepared at once for hangars, repair shops, administration building and other field units. A marine and rail terminal will also be developed at this point, as well as new seaplane base, with hangars, shops and other units. Entire project will cost about \$6,600,000. It is understood that Department of Public Works, City Hall Annex, will be in charge of project; a new Bureau of Aeronautics will be established to operate airport, headed by Lieutenant-Commander R. S. Hedtler.

Becker, Smith & Page, Inc., Water Street and Snyder Avenue, Philadelphia, manufacturer of wall papers, etc., has awarded general contract to Wark Co., 1608 Walnut Street, for two and four-story factory addition, 102 x 305 ft., and 75 x 133 ft., to cost over \$100,000 with equipment. Ballinger Co., Twelfth and

South Atlantic

BALTIMORE, July 28.—In connection with expansion program, Commercial Pigments Corporation, Curtis Bay, Baltimore, manufacturer of paint pigments, etc., will build a one-story machine shop, 70 x 95 ft., for which general contract has been let to United Engineers & Constructors, Inc., 112 North Broad Street, Philadelphia, entire project to cost about \$500,000. Company is a subsidiary of Commercial Solvents Corporation, 230 Park Avenue, New York.

Bids will be received by Department of Commerce, Division of Supplies, Washington, until Aug. 5, for 80 metal cradles for fuel tanks.

E. I. du Pont de Nemours & Co., du Pont Building, Wilmington, Del., manufacturer of industrial chemicals, explosives, etc., has leased a two-story building, 60 x 100 ft., to be constructed at Charlotte, N. C., for factory branch and distributing plant, to cost about \$50,000 with equipment. General contract has been let to Blythe & Isenhour, Brevard Court,

Charlotte; Louis H. Ashbury, 1514 East Fourth Street, same city, is architect.

Zagora Machinery & Parts Co., 1225 South Mint Street, Charlotte, N. C., manufacturer of special machinery, parts, etc., will carry out an expansion program, including installation of additional equipment.

Bids will be received by Chemical Warfare Service, Edgewood Arsenal, Md., until Aug. 4 for 14 electric motors, induction type.

R. T. Lipscombe, Tuckahoe Apartments, Richmond, Va., industrial engineer, is at head of project to construct and operate an automobile service, repair and garage building, to cost more than \$300,000 with equipment. Company will be organized to carry out enterprise.

Power Brake Co., Charlotte, N. C., care of C. A. Cochran, Law Building, Charlotte, recently organized by Mr. Cochran and associates, is considering operation of local plant for production and repair of brakes and kindred equipment for automobiles and motorcycles.

Board of Education, Madison, N. C., is contemplating installation of manual training equipment in new two-story high school to cost over \$150,000, for which general contract has been let to J. R. Owen & Son, West Lee Street, Greensboro, N. C.; Harry Barton, Jefferson Building, Greensboro, is architect.

Edisto Veneer Co., Orangeburg, S. C., has been acquired by J. L. Anderson, Cheraw, S. C., and associates, who plan expansion and installation of additional equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, is asking bids until Aug. 5 for 15 chain hoists, each of 2 tons capacity for Brooklyn navy yard; also for 15 similar chain hoists for New York harbor district.

Virginia Electric & Power Co., Richmond, Va., has awarded general contract to John T. Wilson Co., Mutual Building, for three-story and basement equipment storage and distributing plant, 100 x 100 ft., with repair and service division, to cost about \$260,000 with equipment. Carnegie, Johnston & Wright, Electric Building, are architects.

Electrical Equipment Co., Inc., 406 West Davis Street, Raleigh, N. C., is considering purchase of a number of motors, including 50 and 60-hp. capacity units.

Pittsburgh

PITTSBURGH, July 28.—The machine tool business in this district shows little change, with dealers' sales falling below the June average in many cases, and amounting to less than 50 per cent of the corresponding month last year in the majority of instances. Considerable new business is being developed through the activity of sales engineers, and the improvement programs of many large steel companies in this district are regularly bringing out orders for tools and equipment. The Jones & Laughlin Steel Corporation will be in the market for considerable equipment throughout the remainder of the year in line with its recently announced plant betterments. The Ingalls Iron Works, Verona, Pa., has been a buyer of a number of tools, but has practically completed its plant reorganization program.

New inquiry is light and principally confined to individual dealers.

Keystone Armature Works, Inc., Union Avenue, Altoona, Pa., has asked bids on general contract for a two-story addition, 50 x 55 ft., to cost \$35,000 with equipment. D. G. Puderbaugh, Myers Building, is architect.

Gulf Oil Corporation, Frick Annex, Pittsburgh, will begin construction of new refinery on 120 acres recently purchased on Neville Island, consisting of several units with power house, machine shop and other structures, to cost about \$4,500,000 with machinery. Union Gulf Corporation, lately organized as a subsidiary, will proceed with construction of a pipe line from Tulsa, Okla., to new refinery, to cost over \$15,000,000 with pumping stations, storage, and distributing facilities.

Springfield Foundry Co., 2213-17 Smallman Street, Pittsburgh, plans rebuilding part of plant destroyed by fire July 18.

City Council, Moundsville, W. Va., is considering a municipal electric light and power plant, to cost over \$75,000 with equipment. City engineering department is in charge.

T. K. Hendryx, Tidewater Building, Bradford, Pa., architect, has asked bids on general contract for a one-story automobile service, repair and garage building, 115 x 200 ft., to cost more than \$140,000 with equipment.

Officials of Wheeling Tube Co., Wheeling, W. Va., manufacturer of steel tubing, etc., have arranged for a change of name to Ajax Steel Corporation, at same time increasing capital to \$250,000 for general expansion.

Reliance Steel Castings Co., Twenty-eighth and Smallman Streets, Pittsburgh, has awarded general contract to McClinic-Marshall Co., Oliver Building, for two-story addition, 50 x 60 ft., to cost more than \$40,000 with equipment.

Buffalo

BUFFALO, July 28.—A. A. Henninger, Syracuse, N. Y., and associates have organized Syracuse Gear Corporation to take over and consolidate entire interest of Durant Motors, Inc., Lansing, Mich., in New Process Gear Co., Adams Axle Co., and Warner Corporation, all with local plants at 500 Plum Street, and branch works at Muncie, Ind. New company will continue both units for manufacture of differential gears, transmissions, steering gears, front and rear axles for automobiles, and kindred products. Mr. Henninger has been in charge of operations at plants for a number of years and will head new organization.

Madden Mfg. Co., Inc., Sherburne, N. Y., recently formed by Thomas H. Hoxie and Frank E. Robbins, Sherburne, with capital of \$300,000, plans operation of local plant for manufacture of metal building materials.

Noble Mfg. Co., Cowlesville, N. Y., has been organized by R. A. Noble, Cowlesville, and associates, to establish local plant for manufacture of a sleet destroyer for automobile windshields, using an electric coil. Initial production will be given over to assembling, and company has contracted with Bennett Mfg. Co., Alden, N. Y., for manufacture of brass and steel parts for device. It is proposed to begin production in 30 to 60 days. Edgar Tooley, Cowlesville, is interested in new company, and will be in charge of manufacture.

Robeson-Rochester Corporation, Perry, N. Y., will develop larger output at cutlery manufacturing plant. Company recently scheduled a shut-down for six

weeks, but has resumed production at end of two weeks, owing to increased orders, insuring manufacture on continuous basis for some time.

Cleveland

CLEVELAND, July 28.—The machine tool market continues dull with no signs of improvement. July sales will show a falling off as compared with June. Not much change is looked for through August. Metal-working plants are showing an interest in replacement equipment to cut down the cost of operations, but the general disposition is to withhold purchases until business picks up. The large amount of used machinery that has been put on the market through recent auction sales of plant equipment has been a factor in restricting buying of new machine tools.

Federal Machine & Welder Co., Warren, Ohio, has acquired adjoining property and plans expansion to cost over \$200,000, including new building, installation of equipment and improvements in existing works.

Stainless Steel Products Corporation, Massillon, Ohio, care of Merle D. Evans, Massillon representative, has taken over a local building for production of line of stainless steel products for domestic purposes, automobile service, industrial equipment, etc., to cost over \$35,000.

Youngstown Ice & Fuel Co., Youngstown, has filed plans for a new one-story ice-manufacturing and refrigerating plant, 159 x 200 ft., to cost about \$200,000 with machinery. G. B. Bright, 2615 Twelfth Street, Detroit, is architect and engineer.

White Star Refining Co., 903 West Grand Boulevard, Detroit, manufacturer of refined oils, compounds, etc., with main refinery at Trenton, Mich., has awarded general contract to George W. Lathrop & Sons, Inc., 1116 Madison Avenue, Toledo, Ohio, for new storage and distributing plant at Toledo, to cost close to \$200,000 with equipment.

North Baltimore Grain Co., North Baltimore, Ohio, plans rebuilding part of grain elevator recently destroyed by fire, with loss over \$150,000, including mechanical-handling and other equipment.

Interior Steel Equipment Co., Cleveland, recently organized to manufacture special metal furniture, cabinets, shelving, etc., has started operations at 2359 East Sixty-seventh Street. J. F. Schaefer is president and general manager.

Detroit

DETROIT, July 28.—Alpha Portland Cement Co., Easton, Pa., is considering expansion and improvements at branch mill at Bellevue, Mich., consisting of additional buildings and equipment to cost over \$500,000.

Essex Wire Co., Highland Park, Detroit, occupying part of local plant of Ford Motor Co., is establishing a new division for production of magnet wire specialties, including coils, transformers and similar products for automobiles, and plans to begin production soon with increased force.

Electric Auto-Lite Co., Champlain and Mulberry Streets, Toledo, Ohio, manufacturer of automobile starting and lighting equipment, is discontinuing production at its branch plant at Adrian, Mich., and equipment has been moved to main works

at Toledo, where manufacture will be concentrated.

Board of Education, Escanaba, Mich., is planning installation of manual training equipment in new junior high school, to cost about \$450,000, for which bids have been asked on general contract. H. H. Turner, Michigan Trust Building, Grand Rapids, is architect.

Paul Threadless Bolt Co., Lansing, Mich., has arranged for a change in capital from \$25,000 to 5000 shares of stock, no par value.

Chrysler Motor Corporation, 341 Massachusetts Avenue, Detroit, will establish a new division for production of automobile accessories and will develop branch plant at Newcastle, Ind., as principal manufacturing unit for new line. E. S. Chapman will be general manager of accessory division, with headquarters at Detroit and in supervision of Newcastle works.

H. L. Hartley Machine Co., Owosso, Mich., is planning early production at plant now being established in building recently leased from National Grocery Co. New works will be given over to manufacture of parts and assembling of large machines for polishing stainless steel. W. V. Robinson, Owosso, heads new organization.

Inland Lime & Stone Co., Manistique, a subsidiary of Inland Steel Co., 38 South Dearborn Street, Chicago, is carrying out expansion at plant near Seul Choix Point, including installation of new crushing unit and auxiliary equipment, power substation, etc.

Consolidated Soda Fountain Corporation, Greenville, manufacturer of mechanical refrigerators, soda fountains, etc., will establish new division for production of refrigerated motor truck bodies in different sizes.

Port Huron Sulphite & Paper Co., Port Huron, is negotiating with Grand Trunk Railroad Co. for purchase of 10-acre tract near mill for expansion.

Chicago

CHICAGO, July 28.—Machine tool sales have been relatively small in volume. However, dealers are more optimistic about the outlook for fall, although they do not expect much, if any, gain in August. One encouraging feature is the putting out of individual inquiries for large tools by manufacturers of heavy equipment. These are regarded mainly as "feelers," but indicate that users again are thinking in terms of equipment replacement. A milling machine builder has received an order for seven machines from an Eastern buyer, the transaction totaling from \$30,000 to \$35,000.

Chicago, Burlington & Quincy Railroad has inquired for the following additional tools: One 4-in. heavy-duty drill, one 7-ft. radial drill, one 34-in. sliding-head drill and one 36-in. crank shaper.

Hess Warming & Ventilating Co., 1207 South Western Avenue, Chicago, manufacturer of heating and ventilating equipment, has awarded general contract to C. B. Johnson & Son, 306 South Wabash Avenue, for new two-story plant, 120 x 125 ft., to cost about \$100,000 with machinery. W. H. Tomlinson, Morris Building, Joliet, Ill., is architect.

Perry Coal Co., Belleville, Ill., is planning to rebuild part of tipple at Superior mine, destroyed by fire July 21, with loss reported over \$140,000.

Denver, Rio Grande & Western Railroad Co., Denver, is considering extensions and improvements in engine house and locomotive repair shops at Pueblo, Colo., for handling larger locomotives, to cost over \$50,000 with equipment. Arthur Ridgeway, Denver office, is chief engineer.

Bureau of Reclamation, Denver, is asking bids until Aug. 14 for one 2-column hydraulic compression machine of 2,000,000-lb. capacity, motor operated.

Board of Education, Burlington, Iowa, is considering installation of manual training equipment in new junior high school, to cost about \$200,000, for which plans will be prepared by W. F. Weibley, Burlington, architect.

LaPlant-Choate Mfg. Co., First Avenue, Cedar Rapids, Iowa, has work underway on one-story addition to steel dump wagon and tractor manufacturing plant, 35 x 140 ft., to cost about \$30,000 with equipment.

County Highway Department, Pueblo, Colo., is considering rebuilding part of repair shops recently destroyed by fire, with loss of about \$50,000, including machinery.

City Council, Pierre, S. Dak., is asking bids until Aug. 8 for equipment for municipal electric light and power plant, for which bond issue of \$125,000 is being arranged, including two 4-cycle air injection Diesel oil engines, each about 600 hp.; two electric generator units of capacity for Diesel engines; two direct-connected exciters, switchboard, instruments, wire, cable, etc.

Minnesota Power & Light Co., Duluth, Minn., plans rebuilding part of steam-operated electric power plant at Cloquet, Minn., recently damaged by fire.

Majestic Household Utilities Co., 5801 Dickens Avenue, Chicago, manufacturer of domestic electric appliances and equipment, a subsidiary of Grigsby-Grunow Co., has awarded general contract to A. S. Low, 510 North Dearborn Street, for one-story addition, 40 x 175 ft., to cost over \$40,000 with machinery. W. H. Farnum, 510 North Dearborn Street, is architect.

City Council, St. Charles, Minn., plans extensions and improvements in municipal electric light and power plant, to cost about \$45,000.

International Filter Co. and associated companies, International Water Softener Co. and General Zeolite Co. have removed their engineering departments and general offices from 333 West Twenty-fifth Place, Chicago, to thirteenth and fourteenth floors of Buckingham Building, 59 East Van Buren Street.

Bottling machinery, conveying, elevating and other mechanical-handling equipment will be installed in new milk pasteurizing and bottling plant to be erected by Borden's Farm Products Co., Inc., 110 Hudson Street, New York, at Chicago for which general contract has been let to James Shedd & Co., 208 West Washington Street, Chicago, to cost \$500,000 with equipment. E. E. and Elmer C. Roberts, 82 West Washington Street, are architects. Company also has plans for storage and distributing plant at Blue Island, Ill., including service and garage unit, to cost \$150,000 with equipment.

Cincinnati

CINCINNATI, July 28.—While some manufacturers of lathes in this district report a slight improvement in orders, the upturn has not been sufficient to offset the sluggish demand earlier this month. July business in general will show a decline from the level of June. Inquiry is lagging and machine tool builders are not receiving as many requests for quotations as a month ago. Production is about 50 per cent of capacity with no immediate prospect of increasing.

Dayton Power & Light Co., Dayton, Ohio, has awarded general contract to Hillsmith & Co., Dayton, for one-story machine shop, to cost about \$40,000 with equipment.

Rendigs, Panzer & Martin, Southern Ohio Bank Building, Cincinnati, architects, have awarded general contract to Parkway Construction Co., Provident Bank Building, for seven-story automobile service, repair and garage building, to cost about \$200,000 with equipment.

Contracting Officer, Wright Field, Dayton, Ohio, will receive bids until Aug. 5 for 176 oxygen regulators and 13 unit heaters, ceiling type.

Memphis Power & Light Co., Memphis, Tenn., is planning expansion to cost over \$1,200,000, including increased power facilities, transmission lines, and power substations.

Buckeye Saw Co., 285 North Water Street, Columbus, Ohio, has awarded general contract to F. & Y. Construction Co., 731 East Broad Street, for a two-story addition.

Louisville and Jefferson County Airport Board, Louisville, is considering construction of six or eight one-story hangars, with shop and repair facilities, at local airport. Engineering department is in charge.

Liggett & Myers Tobacco Co., 4241 Folsom Street, St. Louis, has begun construction of one-story storage and distributing plant at Lexington, Ky., to cost about \$100,000 with equipment. Company will also lease one-story building, 150 x 170 ft., to be erected at Shelbyville, Ky., for similar purpose.

Board of Trustees, Tennessee Polytechnic Institute, Cookeville, Tenn., will soon ask bids on general contract for new two and three-story industrial arts buildings, each 60 x 140 ft., to cost about \$100,000 with equipment. B. F. Hunt & Co., 801 Tremont Avenue, Chattanooga, Tenn., are architects. Dr. Q. M. Smith is president.

Milwaukee

MILWAUKEE, July 28.—Lack of interest in acquiring new equipment continues and little, if any, change is noticeable in the general machine tool situation. While the market is by no means devoid of orders, the volume of business is small. Prospects for August are considered somewhat more favorable. Production has been adversely affected by several recurring periods of extreme heat. A moderate volume of business is reported in used tools.

Hartford Steel Car Co., Hartford, Wis., has been organized with \$250,000 capital stock to manufacture all-steel steam and electric railroad equipment, including cars, trailers, and trucks. D. L. McWilliams, 123 Wisconsin Avenue, Milwaukee, is principal in enterprise. Contracts

have been awarded for erection of first unit, 70 x 120 ft., with office annex, 32 x 40 ft., at Hartford, Wis., to be ready about Sept. 15.

Lakeside Bridge & Steel Co., 302 Villard Avenue, Milwaukee, which recently added manufacture of traveling cranes, gantry cranes, derricks, and drilling and reaming machines to its activities, has increased its capitalization from \$500,000 to \$1,000,000 consisting of 7500 shares of common and 2500 shares of preferred stock. Accumulated surplus recently was distributed through an 80 per cent stock dividend, remainder of new issues being held for future expansion.

Tesch Mfg. Co., Milwaukee, has been organized by W. C. Tesch to manufacture an automatic saw filing machine designed by him and about to be placed in production. Company has leased space in plant of Milwaukee Welding Works, 57 Twenty-seventh Street, and is installing equipment. Later it intends to build shop of its own.

Western Metal Specialty Co., 1251 Thirtieth Street, Milwaukee, manufacturer of sheet metal products, is purchasing some new equipment for production of a new type of fire extinguisher designed by O. R. Irwin of Milwaukee, formerly associated with Foamite Childs Corporation.

Belle City Malleable Iron Co., 1442 Forest Street, Racine, Wis., has placed general contract with Nelson & Co., Racine, for a shop addition, 40 x 80 ft.

City Water Commission, Racine, Wis., has directed J. W. Beauprand, city engineer, to make plans for a new water storage tank, 65 ft. high and 85 ft. in diameter, on which bids will be taken about Aug. 15, to cost about \$95,000.

Board of Education, West Allis, Wis., will take bids after Aug. 23 for fourth unit of West Allis Vocational School, to cost \$80,000. Robert A. Messmer & Brother, 221 Wisconsin Avenue, Milwaukee, are architects.

Kimberly-Clark Co., 128 North Commercial Street, Neenah, Wis., is taking bids for construction of steam line across Fox River at Appleton, Wis., 408 ft. long, truss-bridge type, with extra heavy wrought steel pipe.

Indiana

INDIANAPOLIS, July 28.—Haynes Stellite Co., Kokomo, manufacturer of welded tools, tool bits, cutter blades, etc., has awarded general contract to Charles L. Sanders & Son, Portland, for two-story and basement addition, 35 x 40 ft., to cost about \$35,000 with equipment. Oscar Cook, Armstrong-Landon Building, is architect.

Bass Foundry & Machine Corporation, Fort Wayne, has been organized with a paid-up capital of \$1,000,000 to take over and expand company of same name, with local plant for manufacture of engines, boilers, tanks and other plate products.

Roach-Appleton Mfg. Co., South Bend, manufacturer of electric switch boxes and other electrical products, has plans for new one-story plant, 200 x 250 ft., to cost over \$115,000 with equipment. Headquarters are at 3440 Kimball Street, Chicago. Fett, Pearson & Goffeney, South Bend, are architects and engineers.

United Plywood Corporation, New Albany, has been organized to take over and consolidate New Albany Veneering Co., with local mill; Breeze Mfg. Co., and United Veneer Co., both with mills at Portsmouth, Ohio, and Gause-Beard Ply-

wood Co., Memphis, Tenn. New company will be capitalized at \$10,000,000 and 500,000 shares of stock, no par value, and plans to increase output of hardwood veneers for furniture, automobile bodies, etc. E. V. Knight, heretofore president of New Albany company, will be chairman of board of United organization.

Redinger-Ball-Morris Mfg. Co., Logansport, manufacturer of electrical cut-outs and kindred specialties, has awarded general contract to L. E. Wickersham, 206 Fourth Street, for one-story addition, to cost \$35,000 with equipment.

Amrad Corporation, 205 College Avenue, Boston, manufacturer of radio equipment and parts, has acquired a factory at Fort Wayne for a branch plant. Company has also purchased former property of Boston Rubber Shoe Co., 183 Commercial Street, Malden, Mass., and will remove Boston plant and headquarters to that location.

Lafayette Steel Products, Inc., Lafayette, has been reorganized by L. E. and J. H. Rush, who have secured controlling interest in company. Manufacture of metal baskets and automobile trunks will be continued. Henry Poor is president; L. E. Rush, vice-president, and J. H. Rush, secretary.

Kokomo Stamped Metal Co., Kokomo, manufacturer of roller skates and toys, has been merged with Kingston Products Corporation of that city, manufacturer of automotive electrical specialties and radio equipment, and hereafter will be known as Toy Division of Kingston corporation. While Kokomo Stamped Metal Co. has always been a subsidiary of Kingston company, consolidation has made available better designing, engineering and production facilities, and plans are being made to broaden lines of manufacture. Kingston Products Corporation also operates local gray iron, malleable, brass and aluminum foundries.

Gulf States

BIRMINGHAM, July 28.—Texas Electric Service Co., Fort Worth, Tex., has arranged for bond issue of \$33,730,000, part of proceeds to be used for expansion and improvements. Company has acquired light and power properties of Northern Texas Traction Co. and Tarrant County Traction Co., at Arlington, Handley, Grand Prairie, Tex., and vicinity, and will carry out expansion to cost about \$450,000, including additional equipment in power plant at Handley, transmission lines, etc.

American Refrigerating Car Co., Miami, Fla., care of A. B. Small, New Court House, attorney and representative, recently organized, is considering operation of local plant for manufacture of mechanical refrigerating equipment for railroad cars, plant units to be operated by power secured from car wheels. Equipment has been patented by S. G. House, 2384 S. W. Tenth Street, who will be active in new company.

G. L. Rousey, Big Spring, Tex., and associates have approved plans for a new oil refinery at Taylor, Tex., to cost about \$150,000 with machinery. It is proposed to organize a company to carry out project. E. L. Chapman will be in charge of construction.

United Chemical Co., Eagle Ford Road, Dallas, Tex., is planning to rebuild part of acid plant recently destroyed by fire, with loss of about \$100,000 including equipment.

J. E. Rasmussen, 2831 Fifth Avenue, Fort Worth, Tex., is at head of project

to construct two-story ice-manufacturing and cold storage plant, 160 x 250 ft., to cost over \$100,000 with machinery. Wyatt C. Hedrick, Inc., National Bank Building, is architect, in charge.

Tampa Electric Co., Tampa, Fla., has acquired plant and property of Auburndale Power Co., Auburndale, Fla., and will consolidate. Purchasing company plans expansion in Auburndale district, including transmission lines.

Lauderdale Dairies, Inc., Meridian, Miss., M. G. Ness, manager, plans installation of automatic bottling equipment, pasteurizing machinery, conveying and other equipment in new plant, for which general contract has been let to L. B. Priester & Son, 1403 Twelfth Avenue, to cost over \$65,000 with equipment. A one-story boiler plant will be built. P. J. Krouse, M. & W. Building, is architect.

Humble Oil & Refining Co., Humble Building, Houston, Tex., has approved plans for one-story storage and distributing plant at Baytown, Tex., to cost about \$100,000 with equipment.

Hobbs Oil & Refining Co., Hobbs, N. M., recently organized by Morgan May, El Dorado, Ark., and associates with capital of \$100,000, has plans for a new oil refinery at Hobbs, to cost over \$85,000 with machinery. Mr. May will be president of new company.

Mississippi Power & Light Co., Jackson, Miss., has authorized sale of bond issue totaling \$7,000,000, part of proceeds to be used for expansion and improvements.

Home Ice Co., Temple, Tex., has taken out a permit for a new one-story ice-manufacturing plant, to cost over \$35,000 with equipment.

Petroleum Machine & Supply Co., Inc., Luling, Tex., recently formed to manufacture oil-well equipment, tools, etc., will take over and consolidate Trahan-Williams Co., and Ussery Machine Shops, each operating local plants for production of equipment noted, with branch plants in Darst Creek, Pettus and Luling oil fields. New owner will continue all plants and plans increased output.

United Gas Co., 601 Commerce Street, Houston, Tex., operating natural gas properties, is considering construction of pipe lines and systems to serve about 40 cities and towns in Louisiana, including Opelousas and vicinity, to cost over \$3,500,000 with equipment.

St. Louis

ST. LOUIS, July 28.—Board of Education, Board of Education Building, St. Louis, will soon take bids on general contract for four-story and basement mechanical shop and equipment works, 100 x 150 ft., to cost over \$100,000. Department of Architecture is in charge. George W. Sanger is acting commissioner of school buildings.

Oklahoma Gas & Electric Co., Oklahoma City, Okla., has arranged for a bond issue of \$6,000,000, part of fund to be used for expansion and improvements. Company has work under way on new generating stations, and plans are under way for new steam-operated electric power plant at Oklahoma City, two stories and basement, 140 x 186 ft., to cost about \$250,000 with machinery.

Board of Education, 400 North Walnut Street, Oklahoma City, Okla., plans installation of manual training equipment in new one and two-story and basement William Howard Taft Junior High School, to cost about \$275,000, for which bids will soon be asked on general contract. Lay-

ton, Hicks & Forsyth, Braniff Building, are architects.

Bemberg & Sons Iron Works, Inc., Little Rock, Ark., has been organized with capital of \$50,000, to take over and expand local company of same name. Julius C. Bemberg, 1110 East Fourteenth Street, heads new organization.

St. Louis-San Francisco Railway, Frisco Building, St. Louis, has awarded general contract to Manhattan Construction Co., Court Arcade Building, Tulsa, Okla., for new power plant at Tulsa, 45 x 56 ft., to cost over \$85,000 with machinery. F. G. Jonah, address noted, is chief engineer.

West Memphis Power & Water Co., West Memphis, Ark., plans construction of power plant, using Diesel engine units, in connection with local waterworks, to cost over \$90,000 with machinery.

Cities Service Oil Co., East Gilbert Street, Wichita, Kan., has plans for a one-story storage and distributing plant, to cost about \$30,000 with equipment.

State Board of Administration, State House, Topeka, Kan., Harry Rhodes, business manager, has asked bids on general contract for two-story boys' industrial school unit, 65 x 148 ft., at North Topeka, to cost about \$100,000 with equipment. Joseph W. Radotinsky, State House, is State architect.

Pacific Coast

SAN FRANCISCO, July 24.—Continental Packing Co., 1267 Park Avenue, San Jose Cal., has asked bids on general contract for new one-story meat-packing plant, to cost about \$60,000 with conveying and other mechanical-handling equipment. Lescher & Mahoney, Bank of Arizona Building, Phoenix, Ariz., are architects.

Salt Water Valley Water Users' Association, Phoenix, Ariz., and Arizona Edison Co., same address, are planning joint construction of steel tower transmission line from Superior to point near Florence, Ariz., with branch line from Sacaton and Maricopa, including power distributing and switching stations, to cost over \$400,000.

Board of Education, Alhambra, Cal., is asking bids until Aug. 7 for manual training equipment. George L. Yelland is secretary.

Stockton Fire Brick Co., Russ Building, San Francisco, manufacturer of fire brick and refractory shapes, has asked bids for excavations for new plant on 20-acre tract recently acquired at Pittsburg, Cal., and will soon take bids for buildings. Plant will cost close to \$500,000 with machinery. K. Theill, 580 Market Street, San Francisco, is architect and engineer.

Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, has applied for permission to issue bonds totaling \$25,000,000, part of proceeds to be used for extensions and improvements. Company is considering new equipment storage and distributing plant, with repair and service departments, at Stockton, Cal., to cost more than \$250,000 with equipment.

Board of Education, Los Angeles, plans construction of a vocational school unit in connection with new high school group on Robertson Boulevard, to cost over \$500,000. John C. Austin and Frederic M. Ashley, Chamber of Commerce Building, are architects.

Portland Metal Spinning Co., 495 Hawthorne Street, Portland, Ore., has awarded general contract to S. S. Parker, Portland, for new one-story plant, to cost about \$22,000 with equipment.

Pacific Power & Light Co., Portland, has arranged for a bond issue of \$17,000,000, part of proceeds to be used for expansion and improvements. Company has purchased controlling interest in Inland Power & Light Co., Portland, and will operate as a subsidiary; Inland company has work under way on a new hydroelectric power development on Lewis River, about 25 miles from Portland, which will be continued under new management. Plant will have initial capacity of 40,000 kw., and will cost over \$1,000,000 with transmission lines.

Board of Education, Provo, Utah, will install a manual training shop in new junior high school, to cost about \$175,000, for which general contract has been let to C. A. Tolboe Construction Co., Provo. Ashworth & Markham, Farrer Building, are architects.

Commercial Club, Pacific Beach, Wash., has plans for a municipal airport on tract 150 x 1000 ft., and will begin work soon, to include hangar with repair and service facilities, oil storage and other field units, to cost over \$65,000.

Thrall Taylor Distributors, Ltd., 3350 San Fernando Road, Los Angeles, representing several local and Eastern manufacturers, has recently been organized. In addition to specializing in production engineering problems, company maintains a plant for light manufacturing and for making special tools, jigs and fixtures. J. R. Stone, formerly superintendent Kinner Airplane & Motor Corporation, is president, and Frank J. Thrall, formerly of Detroit, is secretary-treasurer.

Foreign

OFFICIALS of Grigsby-Grunow Co., 5801 Dickens Avenue, Chicago, manufacturer of radio equipment and parts, and Majestic Household Utilities Corporation, an affiliated interest, manufacturer of domestic electric appliances, have organized Majestic Electric Co., Ltd., London, England, to establish and operate a factory branch and distributing plant for products of two first noted organizations. New company will also maintain similar plants on Continent.

Wiener Lokomotivfabrik, Vienna, Austria, manufacturer of steam locomotives, has purchased Lokomotivfabrik Sigl, Vienna, manufacturer of similar equipment, and will consolidate. Acquiring company proposes to operate both plants and will carry out expansion.

Guzman Brothers, Valparaiso, Chile, are at head of a project to erect a new plant at Vina del Mar, near Valparaiso, for manufacture of synthetic petroleum under special process, using coal tar and petroleum ends as raw material. Plant will have initial capacity of 50 tons a day, including gasoline, kerosene, lubricating and other oils, and will cost over \$250,000.

Societe Anonyme Potasse et Engrais Chimiques, Paris, France, recently organized as an interest of Kali Sainte Therese, Paris, manufacturer of potash products, is planning construction of new plant on Seine River, near Rouen, for manufacture of sulphate of potash and by-products, particularly for agricultural use, to cost over \$300,000 with machinery. New company is capitalized at 20,000,000 fr. (about \$800,000).

French Chamber of Deputies, Paris, France, is considering project for a new airport, including hangars, repair shops, oil storage and distributing buildings, aeronautical laboratories, experimental

plant and other units. It is proposed to arrange a fund of 620,000,000 fr. (about \$24,800,000), to be expended over a period of 60 months, of which 450,000,000 fr. (about \$18,000,000) will be used for construction and maintenance of airport and remainder of sum utilized for experimental branch of project.

St. Regis Paper Co., Watertown, N. Y., has acquired Bates International Bag Co., 48 Wall Street, New York, holding patents for multi-wall paper bags, and will carry out an expansion in foreign countries.

Armando Irala, Gran Via, 3, Bilbao, Spain, wishes to be put in touch with companies specializing in concentration of minerals by flotation process.

Dhansingh Verma, Mirzapur Lodhwada Street, Ahmedabad, India, desires catalogs and other business information from makers of wood screws, bolts and nuts, locks and padlocks, hinges, hammers, paints and varnishes, kitchen utensils, scissors, wire netting, etc.

Canada

TORONTO, July 28.—Canadian Westinghouse Co., Hamilton, Ont., has closed contract with Algoma Steel Corporation for a reversing type, adjustable-speed mill motor, also a flywheel motor-generator set, exciter motor-generator set and complete ventilating equipment and circulating oiling system to drive temporarily a 28-in. three-stand, three-high rail and structural mill. Ultimately equipment will be moved to drive a 36-in. reversing roughing mill.

Northern Electric Co., 1600 Notre Dame Street West, Montreal, will erect a one-story factory addition at Lachine, Que.

Bids will be called immediately by N. A. Armstrong Co., Ltd., architect, 7 King Street East, Toronto, for a two-story addition to plant of Flexlume Sign Co., Ltd., 1074 Queen Street East, Toronto.

Engine and boiler plant of E. Leonard & Sons, Ltd., London, Ont., was recently damaged by fire, with loss of about \$50,000.

Bids will be called soon for construction of waterworks system and filtration plant at Ottawa, Ont., to cost \$1,350,000. A. F. Macallum is commissioner of works. Gore, Nasmith & Storrie, Confederation Life Building, Toronto, are consulting engineers.

Additional contracts have been let for a one-story plant at Walkerville, Ont., for Dominion Forge & Stamping Co. of Canada, Ltd., Walker Road. Building will be 120 x 480 ft., and cost \$150,000.

Wire Specifications.—Copperweld Steel Co., Glassport, Pa. Circular of four pages, devoted to new wire and loading tables of all types of wire.

Extension Cable Connectors.—Crouse-Hinds Co., Syracuse, N. Y. Bulletin 2215 of four pages, containing descriptive listings of Arktite extension cable connectors with watertight rubber bushings.

Intake Screens.—Link-Belt Co., 910 South Michigan Avenue, Chicago. Booklet 1252, of 24 pages, attractively illustrated, showing installations of "Clean Water" intake screens, also announcing the 1930 model traveling water screen; its method of operation, etc.

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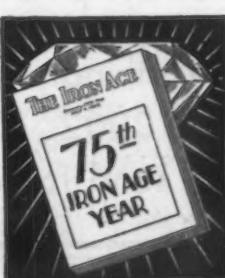
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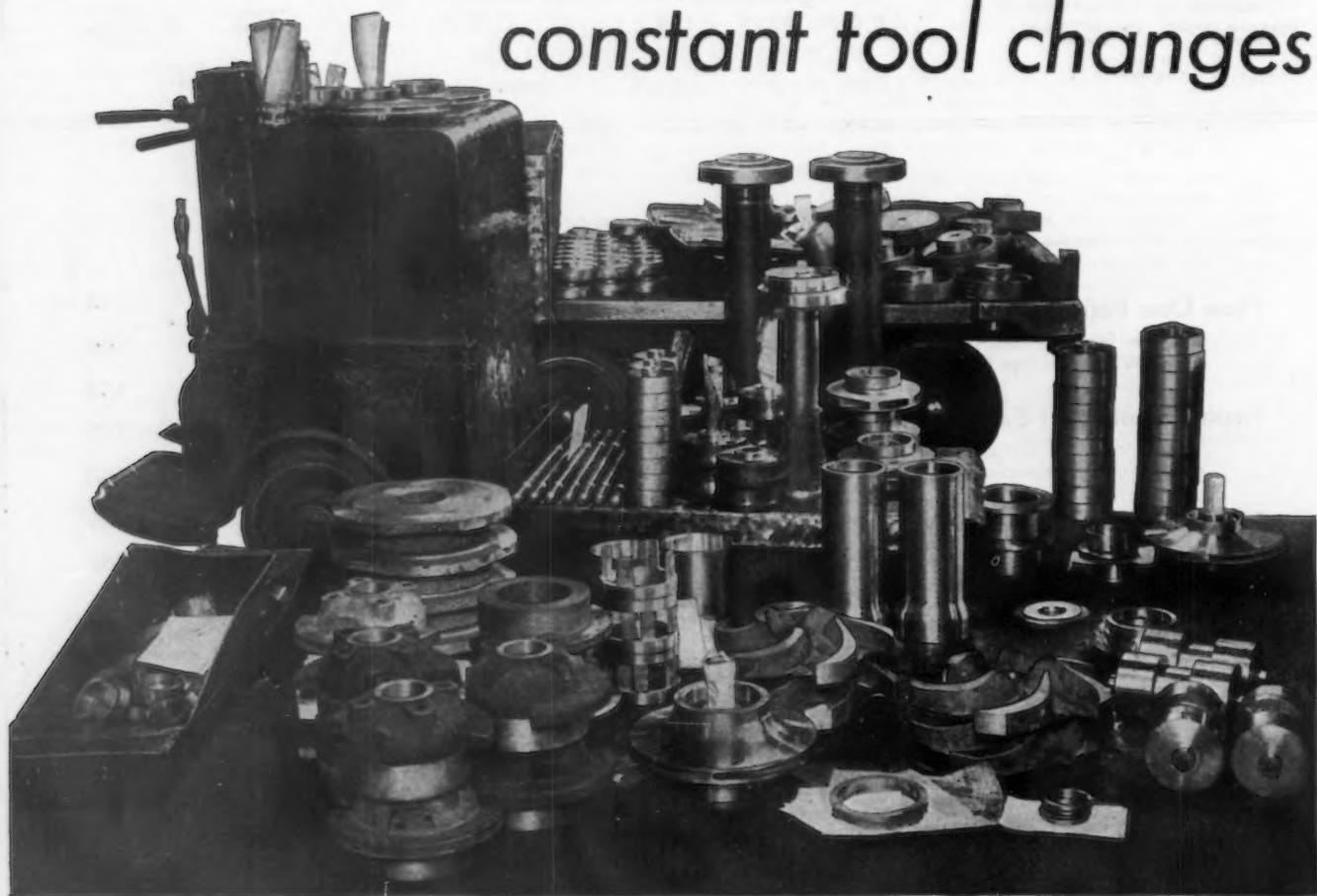
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*These small lot jobs
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